THE

THEORY AND USE

OF

THE CHURCH CALENDAR

IN THE

MEASUREMENT AND DISTRIBUTION OF TIME;

BEING AN

ACCOUNT OF THE ORIGIN AND USE OF THE CALENDAR; OF ITS REFORMA-
TION FROM THE OLD TO THE NEW STYLE; AND OF ITS ADAPTA-
TION TO THE USE OF THE ENGLISH CHURCH BY THE BRIT-
ISH PARLIAMENT UNDER GEORGE THE SECOND.

BY THE

REV. SAMUEL SEABURY, D.D.,

PROFESSOR OF "BIBLICAL LEARNING," ETC., IN THE GENERAL THEOLOGICAL SEMINARY
OF THE PROTESTANT EPISCOPAL CHURCH.
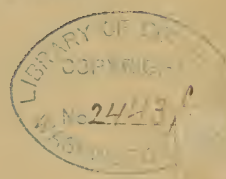
Σή ἐστιν ἡ ἡμέρα, και Σή ἐστιν ἡ νύξ,
Σὺ κατηρτίσω ἥλιον και σελήνην·
Σὺ ἐποίησας πάντα τὰ ὅρια τῆς γῆς,
Θέρος καὶ ἔαρ Σὺ ἐπόιησας.
Ψαλ. ΟΓ. *Ad Vat. Exem. fidem.*

Quid est quod arctum circulum
Sol jam recurrens deserit?
Christusne terris nascitur,
Qui lucis auget tramitem?
PRUDENTIUS. *Octavo Kal. Jan.*

NEW YORK:

POTT, YOUNG & CO.,

COOPER UNION, FOURTH AVENUE.

1872.

CONTENTS.

CHAPTER I.

CHAPTER II.

CHAPTER III.

CHAPTER IV.

CHAPTER V.

CHAPTER VI.

CHAPTER VII.

CHAPTER VIII.

CHAPTER IX.

PREFACE.

FEW of us know what a treasure of ancient learning we possess in the CHURCH CALENDAR. We refer to it regularly to find the Sunday, and perhaps the week-day lessons, and occasionally to find the Saints' days and other Holidays. We open a Church Almanac and see M., T., W., etc., set opposite to six days of the week, and, in odd contrast to these Heathenish abbreviations, we see also opposite to the Lord's day a certain letter which we are told is the Dominical or Sunday Letter for the year; but of the use of this Letter (except for indicating Sunday) and of its relation to the other letters in the Calendar, many of us are content to be ignorant; and what we chance to know of the Golden Numbers and the Epacts, we owe, perhaps, more to our secular than to our Church training.

Now I have no scruple against appropriating the names of Heathen deities to the days of the week, for I suppose that the best use which can be made of Heathen literature is to press it into the service of the Christian Church. But to use the Church designation for one day of the week, and the proper names for the other days, is at least incongruous; and tends, moreover, to blind us to the fact that the letters appropriated in the Calendar to the several days of the week are indissolubly connected with one another, and are the elements of a system of chronology which, in the providence of God, has become curiously inwrought with the texture of ancient and modern learning and with the pursuits of commercial and domestic life.

For these letters in our Calendar are clothed with remarkable functions, and are made subservient to very various and important ends. The merchant refers to a card in his counting-house in which they are made available for finding the day of the month; the historian uses them, in a different combination, in order to refer distant events to their proper years and to measure the intervals between them; and the antiquary by means of them fixes with precision the dates of events of which only a shadowy outline is given in the original records; none of them considering, some of them, perchance, not knowing, that for the ingenious artifices which they use, and which guide them with infallible certainty to the results which they seek, they are indebted to the first seven letters of the alphabet as used in the Calendar throughout the year to designate the several days of the week; or rather to the fact that the Church takes these seven letters in their *alphabetical* order to be, what the proper names of the days are not, the invariable *indices* of the days of the year, and in their *retrograde* order to be the invariable *indices* of the years for all time past, present, and to come.

But there is another fact yet more remarkable, viz., that the unanimity of almost all civilized nations, in Europe and America, in following one and the same standard of time, has been brought about, not by the discoveries of modern science, but by the ingenious and patient labours of ecclesiastics who have, from age to age, watched over the Church Calendar, and sought to bring it as nearly as possible to a state of perfection.

I do not mean that the Church constructed her Calendar with a view to the attainment of these ends. Her chief design was, undoubtedly, to order her divine services, and in particular to secure uniformity in the observance of Easter and the other moveable Feasts; and the results which I have mentioned above were but the overflowings, so to speak, of the abundant care and skill which were expended in the prosecu-

tion and accomplishment of her main purpose. I refer only to the fact that the Calendar has conferred the above named, and other kindred benefits, on all classes of society, as giving it some claim to universal attention and regard. And when one considers, moreover, the many sacred associations by which the Calendar links us to the memories of the past, and the marvellous prescience with which, in the matters whereof it treats, it spreads out before us, by methods nowise dependent on modern science, the events of the future, one is apt to be surprised that a structure, so venerable for its antiquity, so comprehensive in its design, so beneficial in its direct and indirect results, should awaken so little curiosity; and that, too, in spite of the fact that it stands perpetually, as if to inspire reverence and challenge inquiry, in the very front of our Prayer Book.

For this neglect, however, there are several reasons. Most men are content to accept results which they can verify by experiment without caring to investigate their causes, or to trace step by step the process by which they have been elaborated. Persons of this description use the rules of the Calendar without a thought of the reasons on which they are founded; much as the traveller crosses a river heedless of the mechanism of the bridge that bears him, so it but gives him a safe and easy passage. In the case of the clergy there is the further discouragement that the subject, although curious and important, has yet no direct bearing on the practical duties of the Christian life. But after all, as a goodly number of our laymen show a laudable desire to look into the reasons of all Church requirements, and as many of our clergy are not so wholly absorbed in " the weightier matters of the law " as to have absolutely no leisure for its lighter requirements, we must seek for some other cause of the neglect of a study which is at least of as much importance as æsthetics and ritual accessories, and which has been considered, until of

late, a necessary preliminary in theological training. And the obvious explanation seems to be that they who, from motives either of duty or profit, would acquaint themselves with the structure of the Church Calendar, the ends at which it aims, and its methods of accomplishing them, have not the helps which they need to smooth their course and facilitate their study. As a Lectionary, and as a Chronicle of the Saints, the Calendar has been abundantly illustrated; but these are only its subordinate uses, while in reference to its main and distinctive end as a register and distributer of time, I know of no treatise which is specially devoted to it. Not that our divines have neglected it in the valuable works in which it naturally fell in their way; but that they have treated it incidentally, and subordinately to other points, either of history or chronology, which they had chiefly in view; or if some have devoted one or two chapters exclusively to its explanation, they are found to be so brief as, in the estimation of students, to become obscure. Nicholls, Prideaux, Wells, and Wheatley, and our own Dr. Jarvis, among others that might be named, have contributed much that is valuable; but besides the difficulties just mentioned, there is another reason why these authors fail, on the subject under consideration, to meet the wants of our time; and that is, that (with the exception of Dr. Jarvis) they wrote while the Old Style of the Calendar was in vogue in the English Church, and had therefore no sufficient inducement to explain the peculiarities of the New Style. Wheatley is no exception; for the third edition (the first folio) of his "Rational Illustrations" was printed in 1720, and he himself exchanged this world for a better on May the 13th, 1742, more than ten years before the Calendar in our Book of Common Prayer received its present form; so that what purports to be Wheatley's explanation of the new phase of the Calendar must have been compressed into the "Rational Illus-" trations" by subsequent editors.

Hence probably it is that these authors fail to give us any adequate account of the solar and lunar equations, without a knowledge of which it is impossible to understand the reasons for shifting the Golden Numbers, or intelligently to carry into effect those changes in the Calendar which it will soon be our duty to make. So with some other of the directions which were first introduced into the English Calendar in 1752; as, for example, the rule for finding the Dominical Letter—a rule which may indeed be easily verified by experiments, but the reasons of which no author that I have seen has been at the pains to unfold.

The articles on the subject in our several Encyclopedias are indeed worth consulting, and I am indebted to them—to that of Dr. Rees in particular—for useful suggestions. But they are not fitted, as indeed they were not intended, to supply that want of the Church which I am desirous to meet. For, to pass by minor matters which it might seem invidious to mention, the excellent and learned contributors to these works, for the most part, write under the bias of modern science, and look at the Calendar from a point of view quite different from that of the Church. They cannot sympathize with—it is well if they do not scornfully reject—a traditionary system which disclaims demonstration, and which has no higher aim than to discover the celestial phenomena of the future by comparing them with the corresponding phenomena of the past. Hence they are prone to suggest "improvements" which, with a more liberal appreciation of the design of the Calendar, they might themselves confess to be alterations for the worse; and to treat with supercilious criticism what they consider to be defects, apparently for no better reason than that they are the excellencies of a system different from their own.

From these remarks may be gathered, in a general way, the motives which have prompted the present undertaking. I

have not written for the learned, having nothing original to propose. My aim has been twofold: first, to excite the curiosity and to satisfy the inquiries of intelligent laymen in regard to one of the most venerable structures of the Church; to set before them the motives in which it originated, the obstacles which it encountered, and the persevering labours which, age after age, overcame those obstacles and brought the Calendar to its completion. Secondly, to put into the hands of candidates for the Ministry and theological students a work which may, I hope, be found useful in dispelling the mists in which the Calendar is commonly thought to be wrapped, in showing its value for the elucidation of some obscure controversies in the early Church, and in so explaining its construction as to save them from the unscholarly habit of applying mechanically rules and directions which they have taken merely on trust, and of which they can give no better account than that on trial they have always found them to succeed. And these two ends, it seemed to me, might be united and best attained by a sort of historical sketch of the origin and changes of the Calendar and of the reasons for them.

I must confess to another motive for publishing at this time. Before the end of the present century the Golden Numbers, which have retained their present place in our Calendar since the year 1752, must be shifted; and as the shifting of the Golden Numbers will involve the necessity of cancelling several of our present Tables for finding Easter and substituting others in their place, I have thought it not unlikely that the whole subject might soon excite among us a larger share of attention than heretofore. The Calendar, as it now stands in our Book of Common Prayer, directs how the necessary changes are to be made at the end of the present century, and of every future century in which such changes will be required. But this arrangement of the Golden Numbers and the directions respecting it do not rest on the same authority

as the other parts of the Calendar. The facts are in brief as follows:

The Church Calendar, when it was brought to maturity, say A. D. 800, was the common property of the Western Church; the British Church, and the Continental Churches, equally consenting in the use of it. At the time of the Reformation the Calendar remained unaltered in the English Church, and it was tacitly or expressly sanctioned at each authorized Revision of the Prayer Book until and including that of the Savoy Conference in 1662. Of course I am speaking of the Calendar considered simply as a register of time; the scriptural lessons which were added to it, and the Saints' days which were expunged, are matters with which I am here no otherwise concerned than to say, in passing, that I regard them as a part of that salutary reform which was brought about by the English Reformation. The Calendar then of Great Britain and of Western Europe marked the changes of the moon by setting the Prime or Golden Number for the year opposite to the day of every month in that year on which a new moon occurred. In 1582, when the Calendar was reformed under Gregory the Thirteenth, the use of the *Golden Numbers* for this purpose was abolished, and the Calendar was so arranged that the *Epact* for the year always fell opposite to the day of the month on which there was a new moon. The Lunar Calendar was thus made perpetual, so as to answer for one century as well as another, without any shifting of the Golden Numbers. In 1752 the British Parliament adopted the Gregorian reform; but in reducing it to practice they did two remarkable things. In the first place they abolished the whole of the Lunar Calendar except that portion of it which belongs to a part of the month of March and a part of the month of April; and in the next place, they retained the use of the Golden Numbers for finding Easter; and taking the Epacts as they were then adjusted to the Golden Numbers by

the Gregorian reformers, ordered them to be used until a new adjustment of them became necessary, and provided two " General Tables " for their readjustment in all future time.

By thus insulating the Paschal Feast from the rest of the Lunar Calendar, the British Parliament seems to have emulated, as far as was consistent with Church legislation, the example of Julius Cæsar, who entirely abolished the Lunar Festivals, and regulated all the solemnities of religion by the solar time alone ; and by retaining the use of the Golden Numbers, the Parliament, without in the least facilitating the finding of Easter-day, deprived us of that feature of the reformed Calendar which constitutes its characteristic beauty and simplicity. The legislation of the Parliament, however, was intended chiefly for civil and commercial ends, and took in ecclesiastical reform by the way ; nor does it appear that the English Church ever sanctioned, in her corporate capacity, the particular method of reforming the Calendar which the Parliament adopted, or that she has done more than informally and passively acquiesce in it. Such being the case, it is evident, I think, that that portion of our Calendar which relates to the way of finding Easter-day under the New Style, including the shifting of the Golden Numbers, and the special and general Tables for the same purpose, stands on a different footing from the rest of the Calendar, and might be recast without creating a precedent for altering a word in any other part of the Prayer Book. Without presuming to offer an opinion upon the expediency of such a course—which certainly ought not to be pressed at the cost of that charity, " the very bond of peace and of all virtues," which our Easter is intended to quicken and enlarge—I have merely ventured in the ensuing treatise to bring the facts of the case to the attention of churchmen, and especially of those to whom the care of the Calendar is chiefly entrusted.

The Church Calendar.

CHAPTER I.

Derivation of the word *Calendar*—Origin of the Church Calendar—Divine Rule for the regulation and division of time—The Church Calendar conformed to it—Feasts Immovable and Movable—Its general design and method.

THE design of the ensuing treatise is, in general, to give an account of the Church Calendar, of the changes through which it has passed, of the principles on which it is constructed, and of the ends which it is intended to subserve.

A Calendar, in a large sense of the word, and as distinguished from an almanac which is renewed from year to year, may be said to be a register for the permanent distribution of time, on astronomical principles, adapted to civil and secular affairs ; and a Church Calendar is further distinguished by its reference to persons and matters of particular importance to the Church. In the present treatise, however, I do not propose to consider the Calendar as a Lectionary for the guidance of the people in the use of the Scriptures, nor as a Register of the Saints and Martyrs to whose commemoration it is subordinated. I shall limit my inquiries to the Church Calendar ; and to it only so far as relates to the computation and distribution of time, and to the sacred purposes which such distribution is designed to answer.

The first day of each month was called by the ancient Romans the *Calends*, from a Greek word signifying *to call*, because on that day the people were called or summoned by the Pontifex into the *Curia Calabra*, and there informed of the holy days of the month. This practice was continued until A. U. C. 450 ; when Caius Flavius, the curule ædile, for the better information of the people, caused the *Fasti* or *Calendar* to be hung up on a pillar in places of public resort.

The Romans were accustomed to reckon interest by the month, and to collect it on the *Calends* or first day of each month. The custom of the Greeks was in some respects similar, but they did not use the word *Calends* to denote the time of payment ; and hence the witticism of Augustus Cæsar,* " To pay on the Greek Calends," for not to pay at all. From the custom of collecting interest on the *Calends*, the book of a Roman banker or capitalist containing the names of his creditors, the money loaned, etc., was called his *Calendarium* or account-book. Moreover, public officers and rich men who rented houses or lands had their *Calendaria* or account-books showing the sums due to them and payable on the Calends of each succeeding month. Hence the *Tristes Calendæ* of Horace, and the *Celeres Calendæ* of Ovid ; for sad indeed is the Calends or *pay-day* for the miserable debtor, and too quickly for his comfort does it come. Hence also Seneca's *Divitem putas cui magnus Calendarii liber ;* you count the man rich whose Calendar shows a large rent-roll ; intimating that *wealth*, in its original sense of *well-being*, is not to be measured by *riches ;* or as our English Platonist (Norris) puts the matter, Happiness is not a thing to be bought or sold by the acre.

---

*· Cum aliquos nunquam solituros significare vult, *ad Kal. Græcas solituros* ait.—Suetonius, lib. II, c. 87.

After the general diffusion of the Gospel in the Roman Empire, the word *Calendar* began to be used by the Latin, as did the corresponding word Μηνολόγιον by the Greek Christians, to denote the Ecclesiastical Register in which were entered the names of the Apostles and Martyrs, and other great men famous for their piety, over against the days on which they were commemorated. For " That sev-
" eral Holidays were observed in the Church from the very
" beginning of Christianity, or at least in the very first
" ages," says Dr. Nicholls, " is a matter I think beyond
" dispute, as particularly the Feasts of the Nativity, Resur-
" rection, Pentecost, etc., which as they are mentioned by
" the most early writers in the Church, so they have been
" esteemed by all antiquity, to have been of Apostolical
" observation. After these came into use the observation
" of the days whereon Martyrs suffered ; one of the first
" instances whereof we have in the people of Smyrna, who
" kept the anniversary day of the martyrdom of *Polycarp.*
" *Eus.* lib. IV, cap. 14. And this happened A. D. 170.
" This practice of the Christians became more common in
" *Tertullian's* time ; who says, *That it was usual to have*
" *annual oblations,* i. e. *solemn prayers, upon the birthdays,*
" i. e. *the martyrdoms. Annuas Oblationes fieri solere pro*
" *Natalitiis.* This institution, St. Basil says had a double
" cause of its original, *That we may be incited to imitate*
" *the zeal of those who have been constant in their Faith*
" *unto death ; as also, That men being exercised in the per-*
" *formance of those duties, might not have leisure to attend*
" *to the profane festivals of the Heathens. Bas. Asc.* cap. 4.
" The following ages were likewise as forward in the cele-
" brating the festivals of the martyrs and holy men of their
" time ; so that at last it came to be so common, as not
" only made the observation of them very troublesome, but

" occasioned them to crowd their Calendars with a set of
" dead saints who, when they were alive, were not worthy
" to be reckoned among wise men. But though they were so
" forward in coining festivals for these modern saints, they
" seemed long to have forgotten the Apostles themselves ;
" they being first brought into our Calendar by one of our
" *English* Councils, viz., that of Oxford, held under Stephen,
" Archbishop of Canterbury, A. D. 1222. But upon the
" Reformation our Church cast off all the festivals of the
" modern martyrs, and retained only those of the Apostles
" and some other few festivals which related to our Saviour."

But besides this natural and laudable custom was another
which was fundamental in the Christian Church, and which
served to enlarge the scope of the Calendar.   For the
Christian Church was a reformation of the Jewish Church,
and as it was essential to the one to observe the Passover
in annual commemoration of the deliverance of the Israel-
ites out of Egypt, so has it ever been an act of pious grat-
itude in the other to observe the anniversary of the cruci-
fixion and resurrection of JESUS CHRIST for the redemption
of mankind.   The fact that Easter, on which many other
feasts and fasts depend, never falls in two consecutive years
on the same day of the year, made it necessary to inform
the members of every church, year by year, of the particu-
lar day on which it was to be observed.   Hence the Cal-
endar came to be a register of the *movable* as well as the
immovable Holy Days of the Church ; and this, as we shall
see hereafter, involved in process of time the addition to it
of two other columns, the one containing the Golden Num-
bers, the other the Sunday and week-day letters.

The divine history of the creation informs us that GOD
made two great lights ; the greater light to rule the day, and
the lesser light to rule the night : and that GOD set them

for times, and for seasons, and for days, and for years. Agreeably to the divine purpose, all nations have been ruled by the apparent motions of the sun and the moon in the adjustment and measurement of times and seasons.

The Church has been governed by the same principle in the construction of her Calendar. Some of her Holy Days she has regulated exclusively' by the course of the sun, and others also by the course of the moon.

Hence the Calendar of necessity assumes two general divisions of time; viz., solar and lunar, the latter of which is subordinated to the former and is regulated by it.

The solar time consists of years, months, weeks and days. Of these, however, the month, as respects the feasts and fasts of the Church, is of no necessary account. It is merely a civil and not an ecclesiastical division, derived to us from Heathen Rome, and retained from dislike of needless change, and for purposes of convenience.

We use the expression *lunar time* to denote the course and changes of the moon ; as we speak of the time of human life from infancy to youth, and from youth to old age and death ; although, as we shall presently see, all time, the lunar time not excepted, is measured by the apparent or real motion of the sun. The period which revolves from one new moon to another, is now commonly called *a lunar month*, and sometimes *a lunation*. In our Calendar, however, until it was adapted to the Gregorian reform under George the II, this period of time was always called *a moon*, so as not to be confounded with the civil month. Such, indeed, was the old English usage, a vestige of which still remains in the familiar compounds of *honey-moon* and *harvest-moon ;* the name of the period in which the luminary revolves being taken, in our own language as in some other languages, by a common figure of speech, from the

luminary itself. And this, particularly in treating of the
Calendar, seems for several reasons to be the better desig-
nation; but whatever name we give to the period, it may
prevent confusion of thought to observe in the outset that
its duration is always estimated and expressed in divisions
of solar time.

Corresponding to this division is that of the Holy Days
of the Church, into those which are immovable and those
which are movable.

The Immovable Feasts are those which always occur, each
in its turn, on one and the same day of the year. Of these it
is to be noted that while they occur severally on the same day
of the year, they may, and indeed must for several years
in succession, fall on different days of the week; as, for
example, the Feast of the Nativity, which, though always
kept on the same day of the year, the 25th of December,
yet falls for several successive years on different days of the
week.

The Movable Feasts and Fasts are those which follow
the course of the moon. Of these the principal is Easter-day,
which is deservedly called the Queen of Feasts, not only
because of the importance of the event which it commem-
orates, but also because a large number of Holy Days, some
of which precede and others follow it, are dependent on it
for the time of their celebration. They are said to be *mov-
able* because, following the course of the moon, they shift
their places in the Calendar, which is regulated by the
course of the sun. And with regard to these Movable
Feasts and Fasts it is to be noted that, although they fall
on different days of the year, they are yet, at least the chief
of them, tied up to particular days of the week; the events
which are commemorated by them, viz., the Crucifixion of
our BLESSED LORD, His lying in the grave, His Resurrec-

tion and Ascension, having given even to the week-days on which they occurred an indelible and perpetual hold on the hearts of His followers.

There can be no doubt that the construction of the Calendar in both these respects has been the fruit of patient thought and elaborate calculation, and the fact that it gives us only results, without an explanation of the process by which the results are arrived at, invests it with a dry and repulsive appearance. Hence it comes to pass that many learn to use the Calendar without an attempt to understand it, as thinking that the principles on which it is founded are beyond their reach, or at least not to be mastered without an inconvenient degree of study and application. But as it is not necessary for one to be an architect in order to trace the progress of a cathedral from its rude beginnings to its magnificent completion, and to understand the principles on which its parts are adjusted and its proportions maintained, so neither is it necessary for one to be either an astronomer or a mathematician in order to understand the rationale of the Church Calendar, and the process by which its results are obtained. This is all which I undertake to show: and if those who happen to be unacquainted with the subject will give me their attention, I think I may promise them in return some curious information.

CHAPTER II.

OUR notion of Time is formed from the succession of events. One event happens and after that another; or the same event recurs: and Time is the measure of the interval between them. But succession depends on motion, and of all motion that of the heavenly bodies is the most uniform and regular. The sun rises, and after an interval he rises again. We behold the new moon, and after it has waxed and waned we again see its crescent form in the west. We observe the sun at the vernal equinox, and watch his march through the zodiac, and the changing seasons that attest his progress, until he returns again to the point from which he started. Our faith in the uniformity of nature, fortified by experience, leads us to believe that the heavenly bodies will continue to move hereafter by the same laws and with the same regularity as they have moved heretofore; and hence we conceive of these intervals as happening in the future as well as in the past. Now Time is the measure of these intervals; or to give the precise and unsurpassed definition of the Stagyrite, it is ἀριθμὸς κινήσεως κατα τὸ πρότερον και το ὕστερον, *a measure of motion in reference to the past and in reference to the future.*

But we cannot discourse intelligibly about the measure

of time or motion without a *standard* of measurement.
We may have indeed a vague notion that some intervals
are larger than others, but we cannot describe the excess of
one interval over another, nor even represent it clearly to
our own mind, unless we have a *unit* by the repetition of
which we can tell *how many times* the one interval exceeds
the other. Hence in everything which is capable of meas-
urement we adopt a *standard unit* whereby to measure ;
and as it is necessary that men should agree upon a unit,
so the particular unit on which they so agree, is found for
the most part to be one which nature itself has suggested
and moved them to adopt. Thus in the measurement of
place, or of length and breadth, the *foot*, the *hand*, the
nail, and the elbow (*cubitum*), have either furnished or sug-
gested a conventional unit ; as Moses when he describes the
ark tells us that its length was three hundred cubits, its
breadth fifty cubits, and its height thirty cubits. Nor as
respects time, have we far to seek for what we want ; for it
is not a little remarkable that men of all ages and countries
have concurred in adopting the *day* as the unit for the
measurement of time. By the *day* I here mean the natu-
ral day, or what the Greeks call νυχθήμερον : that is to say,
the time which intervenes between the sun being in the
meridian and being next in the meridian again.

The reason of this universal agreement is no doubt to be
found in the fact that the day or *nycthemeron* is the small-
est natural division of time which is of uniform duration.
Day and night, taking the words to denote the interval
from sunrise to sunset, and from sunset to sunrise, are in-
deed natural divisions, but they vary in duration in differ-
ent climates, and in the same climate at different seasons
of the year. But not so with the natural day, or the inter-
val from noon to noon, or from midnight to midnight, for

this is found from experience to be of average length throughout the year.

The division of the natural day into hours, or twenty-four parts of equal length, is arbitrary, and as far as I know of uncertain origin. No such division is recognized in the Old Testament; and the hours mentioned in the New Testament, and borrowed probably by the later Jews from the Romans, were divisions of the day from sunrise to sunset, and consequently varied in length at different seasons of the year and in different latitudes at the same season. Thus the Romans had their summer hours and their winter hours; the former of which (supposing the days in summer to be fifteen and those in winter eight hours long) would be equal to an hour and a quarter, and the latter to forty minutes of our time. This division, however, viz., of the day into twenty-four equal parts, including the subdivision of the hours into minutes, seconds, etc., to whomsoever we owe it, conduces very much to precision of thought and language, and is of the greatest importance.

The next natural division of time is the lunar month—sometimes, as in the Church Calendar, called simply the moon, or the interval from the φασις or first appearance of the moon after its conjunction with the sun to its next appearance; or as is commonly said, from one new moon to the next. This interval would naturally be computed in days and the fractional parts of a day. The length of a synodical month, or the interval from one conjunction of the moon with the sun to its next conjunction, is twenty-nine days, twelve hours, and forty-four minutes, or *very nearly* twenty-nine days and a half; and from this the length of the illuminative month, or the space from the first appearance of one new moon to the next, nearly and in

the long run entirely agrees. Hence among some ancient nations the lunar year was made (first by Solon, as Archbishop Potter tells us,) to consist of alternate months of twenty-nine and thirty days each.

The seasons, or the intervals between the vernal and autumnal equinoxes and the summer and winter solstices, are also natural divisions of time ; but the largest natural division, and that which has been chiefly used for the purposes of computation, is the *Solar Year*, or the interval of the sun's revolution from one point in the ecliptic—say that which it holds at the autumnal equinox—to the same point again. The duration of the year was originally estimated to be three hundred and sixty days, an estimate to which the ancients were probably led, or in which at least they were confirmed, by tracing the course of the sun through the twelve signs of the zodiac, which together make a circle of three hundred and sixty degrees. But whatever were the reasons, the fact is certain, that the year was originally computed to consist of three hundred and sixty days, or twelve solar months of thirty days each, and that five days were afterwards added to the three hundred and sixty for the sake of greater accuracy. This appears from the history of the flood (Gen. vii, 11, compared with Gen. viii, 3 and 4), when the time from the beginning of the flood to the resting of the ark on Ararat is declared to be precisely five months, and these five months are explained by the sacred writer to consist in all of one hundred and fifty days ; which is thought by some to show that the ancient Egyptian year was reckoned to be twelve months of thirty days each. The same year was used for the purposes of sacred computation long after the true length of the year was more accurately ascertained. For the prophet Daniel speaks of a *time, times,* and the *dividing of time :* and what he means

by these expressions we learn from St. John, who refers to the same divisions under different names. For what Daniel calls a *time, times,* and *half a time,* St. John calls in one place forty-two months, and in another place twelve hundred and sixty days (Daniel xii, and Rev. xi and xii), which shows that the year of Daniel was equal to three hundred and sixty days. For

$$
\begin{aligned}
\text{a time} &= 360 \text{ d.,} \\
\text{times} &= 720 \text{ d.,} \\
\text{and a half time} &= \underline{180 \text{ d.,}} \quad \text{are equal to} \\
& \quad 1260 \text{ days,}
\end{aligned}
$$

or forty-two months of thirty days each.[*]

Profane history also points to the same conclusion. Bishop Cumberland, in his Sanchoniatho, quotes Syncellus to the effect that Assis or Arcles, the Hercules of the Phenicians, added five days to the year, which was before reckoned by the Egyptians to be three hundred and sixty days. "This was done," the Bishop adds, "before Moses wrote; "and therefore I presume he, being bred skillful in all "Egyptian learning, understood and made use of this "exacter year in expressing the lives of the patriarchs."[†] The addition of the five days is also intimated in the fable which Plutarch, in his celebrated treatise *De Iside et Osiride,* reports from the Egyptian priests; viz., that Mercury, playing at dice with the Moon, got from her a seventy-second part of the year ($\frac{360}{72}=5$), which he afterwards added to the three hundred and sixty days. These, he adds, were the days anciently called *Epagomenæ,* or *intercalary,* on which the feasts of the gods were celebrated.

Mercury was the same with the Egyptian Thoth or Athotes, the son of Misraim, and a grandson of Ham. Hence

---

[*] See Bedford's Chronology.

[†] Cumberland's Sanchoniatho, p. 297. Con. also p. 168 and p. 462.

the meaning of the fable seems to be that when Ham, the
son of Noah, settled in Egypt, the year was counted to
consist of three hundred and sixty days. "But in the
"space of about one hundred and fifty years," says Mr.
Bedford, "the sun had twice shifted its course, or the be-
"ginning of the year had passed twice through all the
"signs of the ecliptic, and come to the place where it was
"at first ; i. e., the Egyptian year had in this space of time
"retrograded to the Julian. Which Mercury or Thoth the
"king of Egypt perceiving, he added five days or *epago-*
"*menæ*, that so the year might be fixed for the future."

Whether the above explanation as to the time and man-
ner in which the change was made be satisfactory or not, it
is at least certain that the year was computed to consist of
three hundred and sixty-five days from a very remote period
of antiquity, and that this result was obtained by the addi-
tion of five days to three hundred and sixty days. Lepsius,
one of the recent investigators of the monuments of ancient
Egypt, on the evidence of a grotto at Benihassan, refers
its origin to the twelfth dynasty, that is, before the inva-
sion of the shepherds. That this year, consisting of twelve
months of thirty days, with five days added, was in use
among the Chaldeans and Egyptians, from whom Abraham
and Moses respectively received it, there seems abundant
reason to believe. Nor could the Israelites, after their set-
tlement in the land of Canaan, have entirely lost it : for
though we should admit with Dean Prideaux (in opposi-
tion to Kepler and Archbishop Usher) that their year was
made up of months purely lunar, yet it must be granted
that they were careful, by intercalating their months, to
adjust them to the solar standard. The era of Nabonnassar
(otherwise called Belesis, a Babylonian priest skilled in
astronomy,)—an era not much used by historians, but fa-

mous among the old astronomers as having been used by
the Chaldeans and Egyptians—was settled among the As-
syrians as early as 746 B. C.; and after that it is certain
that the solar year of three hundred and sixty-five days
continued in use until the time of Julius Cæsar; who, by
the advice of Sosigenes, the Egyptian astronomer to whom
he entrusted the reformation of the Calendar, substituted
three hundred and sixty-five and one-fourth days, instead
of three hundred and sixty-five days, as a more accurate
measurement of the year. This is still assumed to be the
length of the year in the Calendar of the Church, and of
all civilized nations ; and the expedients which have
been devised in modern times, to compensate for its con-
fessed want of precise accuracy, make it, as we shall see,
both improbable and undesirable that any change with a
view to greater exactness will be hereafter attempted in the
Calendar.

Not that this estimate of the length of the year was a
new discovery in the time of Julius Cæsar ; for it had been
before known, not only to the Greek astronomers, but also
to the ancient Egyptians, that the true year exceeded three
hundred and sixty-five days by nearly six hours. Hippar-
chus, " the patriarch of astronomy," who flourished between
160 and 125 B. C., computed the length of the tropical
year to be three hundred and sixty-five days, five hours,
fifty-five minutes and twelve seconds ; and not only among
the Greeks and Romans, but among the ancient Egyptians,
the common year, to distinguish it from the true year, was
called *annus vagus*, or the vague year, because the feasts
were observed to travel through it ; those appointed for the
summer coming in lapse of time to be held in the winter,
and those appointed in the autumn to be held in the spring.
And what we call the bissextile or leap year, the ancient

Egyptians used to call the Sothiac or Canical year, be-
cause they discovered the necessity of intercalating one day
in four years by the heliacal rising of the *dog-star*. For
the year consisting, as was at first supposed, of three hun-
dred and sixty-five days, was found by the rising of this
star to advance one day in four years, and at the expiration
of fourteen hundred and sixty-one years to return to the
point originally fixed for the beginning of *Thoth*, the first
month of the Egyptian year ; thus showing that the year
should be reckoned to consist not of three hundred and
sixty-five but of three hundred and sixty-five and one-
fourth days. Thus, by observation of this star, the Egyp-
tians were led to form their great canicular year, and their
greatest canicular year, which consisted of four times three
hundred and sixty-five and one-fourth common years—that
is of fourteen hundred and sixty-one years.

The Egyptians had been taught by long observation and
experience that as soon as the star of which we are speak-
ing became visible in their country, the Nile would overflow
its banks ; and they accordingly, on its appearance, re-
treated to their terraces, where they remained until the in-
undation had subsided. Hence they gave this star the name
of their river *Sihor*—the Nile ; and they pictured it as a
dog, and sometimes as a man with a *dog's head*, because
the star, like a faithful watch-dog, warned them to avoid
the danger of the inundation ; thus attributing to the star, in
their emblematic way, the properties of the *Thotes, Thot* or
Sothis, which was the word in their language for the Latin
canis and the English *dog*. All this, however intelligible,
was " to the Greeks foolishness " ; among them Sihor, or *Si-
rius*, as they wrote the word, and the dog-star were all one ;
physical properties were substituted for emblematic ; and
to the dog-star was ascribed, as its name required, the

power of intensifying the heat of the season, and shedding a baleful influence on animated nature in general, and particularly on the canine race. Such is a probable account of the origin of one of those "vulgar errors" which have been embalmed in the Pseudodoxia Epidemica with prodigal stores of learning, for the admiration of posterity.[*]

It is pertinent to ask whether the description of the canicular year of the Egyptians, which is given above, and which has been transmitted to us by ancient Greek authors who travelled in Egypt and conversed with the priests, is confirmed by the late discoveries in Egyptian archæology. On this subject Mr. Kenrick gives us the following information :

"One of these Sothiac periods came to a conclusion in historic times ; expiring in A. D. 138–9. Reckoning backward fourteen hundred and sixty years, we come to 1322 B. C. This does not absolutely prove that it was in use 1322 B. C., or was then first established ; but it has been thought that the monuments supply this deficiency. The period is called Sothiac, because the time assumed for its commencement was when Sirius or the Dog-star, called by the Egyptians Sothis, and consecrated to Isis, rose heliacally on the first day of Thoth, the first month of the Egyptian fixed year, the 20th of July of our reckoning. This phenomenon appears to have been fixed upon from the brilliancy of the star, which would make it more conspicuous ; and its coincidence with the commencement of the inundation, which occurred about this time, made it still more appropriate as the starting-point of an Egyptian period. Now in the astronomical monument at the Rame-

---

[*] Confer. Stillingfleet's Origines Sacræ, Book I, Chap. VI. Brady's Clavis Calendaria, Vol. II, p. 82, and Brown's Pseudodox. Epidem. or Vulgar Errors, Book IV, Chap. XIII.

seion, in the middle of the vacant space between the months Mesori and Thoth, is a figure of Isis—Sothis. It is inferred that this monument was erected in commemoration of the commencement of a Sothiac period, and the chronology of Egyptian history suits well enough with the date of the work, which belongs to the age of Rameses II or III. Though the evidence of the monument is not decisive of the year, there is nothing improbable in the supposition that the true length of the year was known, and a period established for bringing the vague and the true year into harmony, in the latter part of the fourteenth century before the Christian era; and astronomical calculation shows that Sirius rose heliacally at Heliopolis on the 20th of July in the year 1322."*

The course and changes of the moon would naturally lead men from the beginning to the observance of lunar months; and we have reason to believe that under the patriarchal as well as under the Mosaic dispensation, the new moon was a time of religious solemnity. But this is by no means inconsistent with the account which we have given of the use of the solar year and months. The first full moon after the autumnal equinox was probably the beginning of the patriarchal year, the most ancient nations having made this period the commencement of the year: and the observance of the full moons that succeed one another between one autumnal equinox and the next, is so natural and obvious a division of time that it seems quite impossible it should have been neglected. Equally probable is it, however, that men would soon perceive the necessity of adjusting the lunar months to the solar year. For the time of the equinox, when the sun rises and sets at the cardinal points of the East and West, and when the day

---

* Kenrick's Ancient Egypt, Vol. I, p. 281.

and night are of equal length, was too marked not to be
noted ; and when men saw that twelve lunar months fell
short of the interval between one autumnal equinox and
the next, and that thirteen months exceeded it ; and when
they observed, moreover, that the lunar month could not
be measured by a whole number of days, they would natu-
rally seek for some expedient whereby these irregularities
could be harmonized. And as the space of twelve lunar
months was nearer to the measure of a solar year than any
other number, and as thirty is a more tractable number for
the days of the month than twenty-nine (between which
two numbers the truth lies), it is altogether probable that
the patriarchs would soon learn to adjust both their lunar
years and lunar months to the solar standard.

The week is, I apprehend, an arbitrary and not a natural
division of time ; of divine appointment and not of human
contrivance. Its very great antiquity is beyond dispute :
and if it had been of human origin it would more probably
have consisted of eight days than of seven ; the number
of days in the year (not counting the five added days which
were reckoned sacred among the most ancient nations, and
so in a manner separated from the rest of the year,) being
exactly divisible by eight. Or if it be thought to be a di-
vision of the month suggested by the four changes or quar-
ters of the moon, it would have been in this case quite as
likely to consist of eight days as of seven. Moreover, the
fact that a week of eight days (and such a week was actu-
ally used by the old Romans*) was an aliquot part of the
primitive solar year, would naturally, in case of doubt,

---

* Mr. Browne, in his *Ordo Seculorum*, pp. 457, 458, tells us that the old
Romans had a " week " which " consisted of eight days ; the farmers
" worked seven days, and on the eighth (in the Latin idiom *nono quoque*
" *die*) went into the city to market, and to acquaint themselves with city
" affairs."

have inclined men to adopt it rather than a week of seven days. That the days of the week were called among many ancient nations after the names of the seven planets, is readily admitted ; but this, far from proving its human origin, rather proves the reverse ; for surely the week must have existed before men ever thought of giving names to its days. Moreover, all attempts to explain the origin of the week on natural causes are purely conjectural ; but why resort to conjecture when the divine appointment of one day in seven, and the reason of the appointment are plainly recorded in Holy Writ ? The fact of this divine appointment, handed down by tradition from our first parents to Moses, and by him committed to writing, is, as it seems to me, the sufficient and the only satisfactory explanation of the origin of this division of time. It was simply the force of truth which extorted from Delambre the confession, that " As the week forms neither an aliquot part of the " year, nor of the lunar month, those who reject the Mosaic " record will be at a loss to assign to it an origin having " much semblance of probability."

The Hebrews may be said to have had two years, the civil and the sacred. In common with most ancient nations they began the civil year, which was a solar year of three hundred and sixty-five days, at the autumnal equinox. The commencement of the year at this time is fancied by some to have been suggested by the cessation from the labours of agriculture and the ingathering of the fruits of the earth. But surely if nature suggests any season for the beginning of the year, it is the time of the winter solstice, when the sun begins to revive and increase in power, or of the vernal equinox, when the vegetable and animal creation are awakening, as it were, from the torpor of death and entering on a new life. Indeed, the commencement of the

year at the autumnal equinox, when the emblems of decay
and death begin to show themselves, seems to me to be so
unnatural that I would much rather ascribe its prevalence
among ancient nations to the traditionary belief that the
creation of the world was completed at that season.

The sacred year of the Hebrews began at the vernal
equinox, and was a lunar year consisting of twelve lunar
months, to which was added a thirteenth month once in
three years, or more exactly seven times in nineteen years,
in order to adjust the lunar to the solar year. This begin-
ning of the sacred year, in marked contrast to the Egyp-
tian custom, was instituted by Moses in commemoration
of the deliverance of the Hebrews out of Egypt. From
the Hebrews it passed to the Christian Church. It is at
least certain that in Great Britain the sacred year from the
twelfth century, and the civil year from the fourteenth cen-
tury, began on the Feast of the Annunciation, March 25th,
and that this regulation had the force of law until A. D.
1752, when it was abolished by the same statute which es-
tablished the Gregorian reform in the British dominions.

Of the minor divisions of time it is only necessary to say
that they are fractional parts of the day. By assuming the
day (*nycthemeron*) as the unit, and dividing it into hours,
and these hours into minutes, the minutes into seconds,
etc., we are enabled to express every other portion of ascer-
tained time with the greatest possible precision. Do we
inquire, for example, how long a time it takes for the moon
to revolve around the earth, or the earth around the sun?
The answer in either case is given in days, hours, minutes,
etc.; that is to say, we assume the day as the unit of meas-
urement, and counting the number of these units that in-
tervene from one new moon to the next, or from one vernal

equinox to the next, we give the answer as nearly as we can ascertain it, in these concrete units and their fractional parts ; in other words, in days, hours, minutes, etc., to the greatest imaginable degree of exactness.

The day, however, though the best unit that can be assumed for the measurement of time, is found to be incommensurable with every other natural division of time. In other words, neither the solar year, nor the solar month, nor the lunar year, nor the lunar month, can be measured in days without the use of fractions. This difficulty, like the relation of the diameter of the circle to its circumference, is founded in the constitution of things, and therefore impossible to be removed. The embarrassment which it must cause in the adjustment of the lunar to the solar time is at once obvious. If the sun passed through one of the twelve signs of the ecliptic in the same time that the moon revolves around the earth, so that twelve lunar months would be equal to one year, the difficulty would not exist. But when we consider that the solar year consists (according to Mayer) of 365d. 5h. 48' and $42\frac{1}{2}''$, while the lunar synodical month consists of 29d. 12h. 44' 3'' and 11''', we cannot but consider with a feeling of awe that though GOD "ordereth all "things in measure and number and weight,"* yet that his measure is not as our measure, nor his numbers capable of expression in human formulas.

In fact, when we come to calculate and adjust the motions of the heavenly bodies so as to adapt them for a series of years to the purposes of human life, we find ourselves beset with difficulties and embarrassments which only the collective observation and experience of many centuries

---

* Book of Wisdom, xi, 20.

have enabled us, and after all only approximately, to remove.

One means of relief from these perplexities is found in the *Cycle;* a word of Greek origin, which means a *circle,* but which is used in chronology to denote a portion of time at the end of which events and phenomena return exactly or very nearly to the same position in which they were at the beginning of it. In every complete revolution of a wheel on its axis, we see that the several points of the wheel, though they vary their position during the revolution, are at the end of it found in the same place as at first. So when a course of phenomena or events is discovered constantly to repeat itself within a definite portion of time, this portion of time is called a cycle ; and one of the advantages of the cycle in chronological computations is that it enables the computist to rid himself of fractions, and adjust the divisions of time in whole numbers. On the supposition, for example, that the solar year consists of exactly three hundred and sixty-five days, and the lunar month of exactly twenty-nine and one-half days, and that consequently every lunar year is eleven days shorter than a solar year, it would be found that eight solar years and eight lunar years (with three months, two of twenty-nine days and one of thirty days, intercalated) are exactly commensurate : either period consisting of exactly two thousand nine hundred and twenty days. The supposition, though inaccurate, may serve to show, in passing, the nature of a cycle, and one of the advantages to be derived from it.

The whole structure of the Church Calendar is built on cycles—the solar cycle of twenty eight years, and the lunar cycle of nineteen years ; and the combination of the two in one period of five hundred and thirty-two years, com-

monly called the Paschal cycle. These come next in order to be explained ; but as the Roman method of computing time passed into the use of the Western Church, and is sanctioned by the last Revision of our Common Prayer Book, it may be well to extend these introductory remarks so as to include a chapter on the Roman Calendar.

CHAPTER III.

BEFORE the time of Numa Pompilius the Roman year was divided into ten months, containing in all three hundred and four days. Such a year coincides neither with the revolution of the earth around the sun, nor with ten revolutions of the moon; and yet Niehbuhr is of the opinion that by means of intercalation and a cycle of one hundred and ten years, the ancient Italian nations insured greater accuracy in their calendar than was attained by the Julian method. Be this as it may, Numa divided the year into twelve lunar months, and introduced a system of intercalation by means of which, on every four and twentieth year, the days of the lunar coincided with those of the solar year.

Why the year before the time of Numa was divided into ten rather than any other number of months, it is difficult to say. Ovid gives us our choice of three reasons : the first because men used anciently to count from the number of their fingers, and the third because the multiplication of units is expressed up to ten in simple numbers, and above that in numbers compounded with ten. For the second reason I refer the reader to the original, merely venturing to remark that in ascribing the event mentioned in the second line to the tenth month, the poet may have reckoned

the month to consist of twenty-eight days, or the tenth part of two hundred and eighty days, which is the period of child-bearing in women.* Having told us that the year anciently consisted of ten months, Ovid adds:

> Seu quia tot digiti per quos numerare solemus,
> Seu quia bis quino fœmina mense parit,
> Seu quod ad usque decem numero crescente venitur,
> Principium spatiis sumitur inde novis.

The old Roman year began with the month of March, traces of which beginning are still found in the names of September, October, November and December, which were originally so called because they were the seventh, eighth, ninth and tenth months of the year. For the same reason July and August were anciently called Quintilis and Sextilis, though their names were afterwards changed in compliment to Julius and Augustus Cæsar. The two months added by Numa were January and February, and these were placed at the end of the year, the beginning being in March.

Of the changes made in the Calendar in its reformation under Julius Cæsar, there were two which have a special bearing on the subject of which we are treating. In the first place, the solar year was then first made by law to consist of three hundred and sixty-five days and six hours: the supernumerary hours, amounting to one day in four years, being provided for by causing the sixth of the Calends of March, or as we would say the 24th of February, to be repeated every fourth year. In the next place, the lunar year was abolished, and the solar year was substituted in its place; the consequence of which was that the months which had been before observed as natural divisions

---

* See Sir George Cornwall Lewis on "The Astronomy of the Ancients," page 21.

of time—as being regulated by the course of the moon— came to be regarded rather as artificial divisions, and had such a number of days assigned to each as served to make up the number of the three hundred and sixty-five days of the year; the distribution of the days was indeed capricious, February being somewhat shorn of its rights in order that the months named in honour of the emperors might appear to better advantage. In fact the month ceased to be regarded in the celebration of festivals, and was retained only for convenience in the civil affairs of life.

The Romans divided their month into three parts; the *Calends*, the meaning of which has been already explained; the *Nones*, a word of uncertain origin; and the *Ides*, so called probably from an obsolete verb *iduare*, to *divide*, because they served to divide the month into two nearly equal parts. The first day of the month was called the Calends; the days between the Calends and the Nones were counted, not as days *after* the Calends, but as days *before* the Nones; the days between the Nones and the Ides were counted in like manner to be days *before* the Ides; and the days following the Ides were counted as days *before* the Calends of the next month. The following table from Fuss's Roman Antiquities will show more precisely their way of computation. The Calends, as has been said, was the first day of every month, the Nones were the seventh day of March, May, July, and October, and the fifth day of the other months; while in those months on which the Nones fell on the seventh, the Ides fell on the fifteenth, and on the thirteenth of the other months. [*See page* 27.]

It appears from this table, and is indeed well known to be the fact, that the Roman method of computing time was the reverse of ours. What we call, for example, the 30th of April, they called the day before the Calends of

Days of our Months.	FEB., d. 28. AN. BISS. 29.	JAN., AUG., DEC., d. 31.	APR., JUN., SEPT., NOV., d. 30.	MAR., MAII, JUL., OCT., d. 31.
1	Calendis.	Calendis.	Calendis.	Calendis.
2	4 } ante Nonas.	4 } ante Nonas.	4 } ante Nonas.	6 } ante Nonas.
3	3	3	3	5
4	Pridie Nonas.	Pridie Nonas.	Pridie Nonas.	4
5	Nonis.	Nonis.	Nonis.	3
6	8 } ante Idus.	8 } ante Idus.	8 } ante Idus.	Pridie Nonas.
7	7	7	7	Nonis.
8	6	6	6	8 } ante Idus.
9	5	5	5	7
10	4	4	4	6
11	3	3	3	5
12	Pridie Idus.	Pridie Idus.	Pridie Idus.	4
13	Idibus.	Idibus.	Idibus.	3
14	16 } ante Calendas Martias.	19 } ante Calendas (mensis sequentis).	18 } ante Calendas (mensis sequentis).	Pridie Idus.
15	15	18	17	Idibus.
16	14	17	16	17 } ante Calendas (mensis sequentis).
17	13	16	15	16
18	12	15	14	15
19	11	14	13	14
20	10	13	12	13
21	9	12	11	12
22	8	11	10	11
23	7	10	9	10
24	6	9	8	9
25	5	8	7	8
26	4	7	6	7
27	3	6	5	6
28	Pridie Calendas Martias.	5	4	5
29		4	3	4
30		3	Pridie Cal. mensis seq.	3
31		Pridie Cal. mensis seq.		Pridie Cal. mensis seq.

May, and what we call the 2d of April, they called the 4th before the Nones. All the authorities concur in representing this as a "backward" method of counting, and are apt to pronounce it odd and fantastical; and one writer assures us that "The Roman writers themselves (who they are he "does not say) are at a loss for the reason of this absurd "and whimsical manner of computing the days of the "month." But is it certain that the Romans did count their time backwards? To me, I confess, their method seems to be natural, and so far from retrograde that it is just the reverse. We, indeed, look backwards and count from the first day of the month; i. e. from a point of past time. But the Romans were always looking forward to the Nones, the day of relaxation and rest, and counted each day before until the Nones arrived. On the Nones they

began to look forward to the Ides, at which time in one month men entered on office and in another the slaves had a holiday; and they counted the days one by one before the Ides, as children among us count the days before Christmas, until the Ides came. On the Ides they began to look forward to the Calends, and counted the days one by one before the Calends, the poor debtor with fear and trembling, the rich creditor with hope and glee, until the monthly day of payment arrived. What there is in all this which is absurd or whimsical or retrograde I confess myself unable to perceive.

The Western Church, as a matter of course, adopted the Roman method of computation; the same method continued to be used until the era of the Reformation, and is at this day authorized and prescribed by the Church of England; the last revision of the Prayer Book (1662) inserting the Roman method in the Calendar, and marking, for example, the 25th of March, the day on which "the "year of our LORD in the Church of England beginneth," as the 8th before the Calends of April.

CHAPTER IV.

THERE is one division of time of essential importance in the worship of the Christian Church, which was not in use among the Pagans of ancient Rome; I mean that of the week of seven days. The tradition of the Christian Church refers the origin of this sacred division of time to the state of man in Paradise; and the opinion is not devoid of probability that the *first* day of the week was observed under the patriarchal, as it has since been under the Christian dispensation, in commemoration of the creation of the world.* But what is certain and confessed by all is that the week was sacredly observed under the Mosaic dispensation, and that the *last* day of it was dedicated to a twofold purpose: the first universal, that of commemorating the creation; the second national, that of commemorating the redemption of the Israelites from the Egyptian bondage. How many new and very sacred associations endeared the week, and some days of it above others, to the first Christians, we have already had occasion to remark. They knew that their MASTER had come not to destroy the Law but to fulfil it: and they very naturally and laudably carried out His design in this particular, by

---

* See Bedford's Scripture Chronology, near the beginning.

retaining the ancient division of weeks, and observing it in its spiritual significance. They fulfilled this part of the Mosaic Law by consecrating the week to the service of their REDEEMER in the spirit of the New or Christian Dispensation. The first day of it in particular, "The LORD'S Day," as St. John himself calls it, they distinguished above the rest: that they might by the due observance of it commemorate not only the creation of the world, but the Resurrection also of JESUS CHRIST from the dead, and the descent of the HOLY GHOST to write the New Law in the hearts of the faithful. Wednesday and Friday also were reverenced above other days, on account of their relation to the ,Betrayal and Crucifixion of our LORD : and the distinction of these days in the public services of our Church is to this day one of the visible links which bind us to the Apostolical and primitive age ; our Church in this as in greater matters having shown her moderation by shunning opposite extremes ; on the one hand the pietism which exaggerates for fanciful reasons the holiness of the several weekdays so as practically to subvert the preëminence which Scripture and antiquity assign to the LORD'S day, and on the other the wild fanaticism which, as was shown under Cromwell's usurpation, maintains that all days are equally holy in order that all may be equally profaned.

Now as the days of the week fall for several years in succession on different days of the year, it becomes important, for reasons both of religion and chronology, to connect them, so that we may determine the days of the year with which the days of the week shall always coincide.

If the solar year consisted of three hundred and sixty-four days, or exactly fifty-two weeks, it is evident that the days of the week would be repeated year after year in the same order. For then, if any one year began on Sunday,

it would end on Saturday ; the next year, in like manner, would begin on Sunday and end on Saturday ; and so on forever. In this case no inconvenience would result from calling the days of the week only by their proper names, *Sunday*, *Monday*, *Tuesday*, etc., or of denoting them by the ordinal numbers, *First-day*, *Second-day*, *Third-day*, etc., for in this case it would happen that every day of the year would be tied up with one and the same day of the week.

But in fact the common year consists of three hundred and sixty-five days, or fifty-two weeks and one day over : the effect of which would be, if there were no leap-year, that every day of each year would fall, for a period of seven years together, one day of the week later than it fell in the year next preceding it. Thus if the first day of this year is Sunday, the first day of the next year would be Monday, of the next Tuesday, and so on until seven full years shall have been completed : and then the eighth year would again begin with Sunday. If now we take into account the leap-year, four times seven, or twenty-eight years must elapse before the days of the week return to the days of the year. In this way it is evident that no one day of the week has a mark or designation by which it may be invariably assigned to the particular day of the year on which it falls.

Hence the necessity of some expedient whereby to connect the days of the week with the days of the year. The expedient adopted by the ancient Church and still in use is very simple. It consists in designating the days of the week by the first seven letters of the alphabet, taken in alphabetical order, and continually repeated in the same order throughout the year. Thus the first day of January is marked A, the second *b*, the third *c*, the fourth *d*, the fifth *e*, the sixth *f*, and the seventh *g*. The eighth day,

which begins the second week of the year, is in like man-
ner marked A, the second day *b*, the third *c*, and so on to the
fourteenth day, which is again marked *g*. The same nota-
tion is continued throughout the year : all the days of
which are distributed into weeks, and the days of each week
are marked respectively by the first seven letters of the al-
phabet, proceeding always in the same order from A to g.
No attention is paid to the months : the notation being
limited to the days of the week.

Thus, while in common parlance there is no day of the
year or month which has its distinctive and permanent des-
ignation, but each is in turn, for a period of twenty-eight
years, either Monday, Tuesday or Wednesday, etc., or
First-day, Second-day, or Third-day, etc,. yet on the other
hand, in the language of the Church Calendar, every *day
of the year* has its proper and invariable mark for its *day
of the week*. For *every day of the year has its own letter,
and this letter denotes the day of the week on which that
day of the year falls forever.* For example, the Feast of
St. Paul's Conversion (January 25th) has opposite to it the
letter *d*, and the Feast of the Annunciation (March 25th)
has *g ;* and these letters point to the days of the week on
which the above named Feasts respectively fall forever.
The same is true, of course, of all the other Immovable
Feasts.

In order to turn the language of the Calendar into the
language of common life, it is only necessary to know the
Sunday letter for the year ; that is, the letter (which may
be any one from A to g) which in any given year represents
the First-day of the week ; for if we know this, we can at
once give the common name to the day of the week which
is represented by every other letter. In the Calendar of
the Prayer-Book, which is intended for perpetual use, A is

assumed as the Sunday letter, and is therefore printed in capitals throughout the year, while the other letters are printed in small italics. In a Calendar or Church Almanac intended for any particular year, the Sunday letter for the year, whichever of the seven it be, is given in a capital form, and the others in the English Church almanacs are given in italics. As Sunday, in the language of Scripture and the Church, is called *Dies Dominica* or the LORD's Day, so the proper letter for the Sunday of each year is called the Dominical Letter; and so distinguished from the others, which are sometimes called the ferial letters.

By the mere combination of the ferial and Dominical Letters, the Calendar, besides subserving the above named purposes, will be found convenient for the verification of dates and other matters of less importance. With the Dominical Letter of the year, for example, and the letter proper to the first day of the month, we can at once determine the day of the week on which a stated day of the month falls in any given year. For the civil month, though not essential, is yet convenient; and the student will find it advantageous to impress on his memory the letter proper to the first day of every month. To assist him in doing so is the design of the following catch lines; which consist of twelve words answering in their order to the twelve months of the year, the first letter of each word being the proper letter for the first day of the corresponding month:

*A*t *D*over *D*wells *G*eorge *B*rown *E*squire,
*G*ood *C*hristopher *F*inch, *A*nd *D*avid *F*ryar.

By knowing the letter of the first day of the month and the Dominical Letter, we can readily tell on what day of the week any day of the year will fall. On what day of the week did the Fourth of July fall 1870? G being the first

day of July, and B the Dominical Letter for the year, the first day of the month was Friday and the fourth Monday. Or if I would know on what day of the week Christmas fell in 1869, it is only necessary to remember that the first day of December is F, and that consequently C, which was that year the Dominical Letter, is the 5th, which makes the 26th also to be Sunday, and the 25th Saturday.

For the convenience of the reader I subjoin a table of the Immovable Feasts, with their proper week-day letters annexed. By remembering the letter of the holy day and that of the first day of the month, and knowing the Dominical Letter for the year, one will never be at a loss to ascertain the day of the week on which the holy day falls.

a	Feast of the Circumcision. St. Barnabas.	*e*	Purification. St. Peter. St. Bartholomew. St. Matthew. St. Andrew. St. Thomas. Holy Innocents.
b	St. Phil. and St. James. Feast of the Nativity.		
c	St. Mark. St. James. St. Stephen.	*f*	Epiphany. St. Matthias. St. Michael and All Angels.
d	St. Paul. St. Luke. All Saints. St. John the Evangelist.	*g*	Annunciation. St. John Baptist. St. Simon and St. Jude.

Now let us investigate the process whereby the Dominical Letter is ascertained for any given year. The Calendar, it will be observed, assigns to every year three hundred and sixty-five days, and never more. This sum being equal to fifty-two complete weeks and one day over, it is evident that with what day soever of the week the year begins, with that same day of the week it must also end. Let us suppose, then, that the first day of the year is Sunday, and

that A is the Dominical Letter. Then as at the end of the three hundred and sixty-fourth day of the year, there will have been fifty-two complete weeks, it is evident that the three hundred and sixty-fifth day of the same year will also be Sunday and begin a new week. Consequently the first day of the year next following will be Monday ; the second, Tuesday ; the third, Wednesday ; the fourth, Thursday ; the fifth, Friday ; the sixth, Saturday ; and the seventh, Sunday. But in the Calendar the letter proper to the seventh day of January is *g ;* so that if A is the Sunday letter for one year, then G is the Sunday letter for the year next following. Let G, then, be the Dominical Letter for the second year, and we shall find that the last G in the Calendar or the last Sunday in the year, will be the 30th of December, and that the last day of the year will be Monday. Consequently the first day of the next year will be Tuesday ; the second, Wednesday ; the third, Thursday ; the fourth, Friday ; the fifth, Saturday ; and the sixth, Sunday. But the proper letter for the sixth day of January is *f* ; and hence it appears that as G is the Dominical Letter of the second year, so is F of the third year. Proceeding in the same way without regard to the bissextile year, we shall find that E will be the Dominical Letter for the fourth year, D for the fifth, C for the sixth, and B for the seventh. The eighth year will begin a new septenary with the same results. Hence, as the first seven letters of the alphabet, taken in their *alphabetical* order, denote the days of the week for any number of weeks, so the same letters, taken in a *retrograde* order, denote severally the Dominical or Sunday letter for the year, and for any number of years. In other words, a, b, c, d, e, f, g, continually repeated, show the successive days of the week perpetually, and G, F, E, D, C, B, A, continually repeated,

show the order in which the Sunday or Dominical letters perpetually succeed one another.

This retrograde order of the Dominical letters (which, as we shall see, is preserved in spite of the bissextile intervention) is so important to be noted that Petavius and Bede* have given us each a catch-verse to impress it on the memory of the learner ; and not to depart from their example, we may give a like catch in English :

Grant's Foes, Ere Dead, Could Brandish Arms.

But as the Calendar makes the year consist of three hundred and sixty-five and a quarter days, and in order to get rid of the fraction, intercalates one day in every fourth year, which is called a bissextile or leap-year, it becomes necessary to inquire how the order of the Dominical letters is affected by this intercalation.

For the better understanding of the subject, we must carefully distinguish the Calendar year and day from the natural year and day. A leap-year consists of three hundred and sixty-six natural days of twenty-four hours each ; but the Church Calendar makes every year, a leap-year as well as a common year, to consist of exactly three hundred and sixty-five days ; and consequently the intercalated day cannot of itself become a calendar day, but can only be inserted in the calendar by being joined with another day, and having the same letter with the day to which it is joined. The intercalation is made on the sixth day before the calends of March, which answers to our 24th of February ; but it is not made by adding a new day to the calendar year, but by doubling one day in the calendar

---

* Petavius gives us Gaudet Francus Equo, David Cane, Beltezar Agno ; perhaps for the sake of originality, since the traditional verse, accredited to the venerable Bede, is better :

Grandia Frendit Equus Dum Cernit Belliger Arma.

year. Hence the sixth day before the calends of March was twice repeated, and the one day was called the first sixth, and the other day the second sixth ; whence the year came to be called *Bis-sextile.* The proper letter for the 24th of February is *f*, and hence the old copies of the calendar give the rule for that day, " F litera bis numeretur," the letter F must be counted twice ; showing that these two natural days are held and accounted to be one and the same Calendar day, having one and the same letter in common.

By this simple contrivance the Bissextile year of three hundred and sixty-six days is brought within the Calendar year of three hundred and sixty-five days. If a new letter had been introduced to mark the intercalated day, the rotation of the seven letters would have been utterly disordered and destroyed ; but not being a Calendar day, the additional day can have no new letter, and the seven letters revolve in alphabetical order through the bissextile the same as in common years. The fact that one day has its letter doubled, compels us to assign to the bissextile year two Dominical Letters ; which, however, merely retards the return of the Dominical Letters, but does not derange their order. Of the two Dominical Letters in a bissextile year, the first begins the year, and is continued as long as each day of the year has only one week-day letter ; but when it comes to the intercalated day with two letters, its function is arrested, and it yields its place to the letter next to it in retrograde order, which serves for the rest of the year. Thus, if a bissextile year has G for its Sunday letter in the month of January, it retains it until the 24th of February, when, in consequence of the week-day letter being doubled, the year leaps from G to F, and F is the Sunday letter for the remainder of the year.

" When the years of our Lord can be divided into four
" equal parts (i. e., when a given year can be divided by
" four without a remainder), then the SUNDAY LETTER
" LEAPETH ;" and in another place we read that " when
" THE YEAR LEAPETH, the psalms and lessons " shall be
read in a different order from that observed in common
years. Such is the language of the rubrics of the Prayer
Book in Queen Elizabeth's reign, and it was the common
language of that time. And if the year, or its letter, may
by a common figure be said *to leap*, pray why may not the
year itself, for the same reason, be called the *leap-year?*
This, indeed, is the obvious explanation of a matter which
seems to have puzzled our modern cyclopediasts and lex-
icographers as much as if it related to the antiquities of
Egypt or of the antediluvians. One of them, the New
Edinburgh Encyclopedia, amuses its readers as follows:
" Hence the year of three hundred and sixty-six days was
" called *bissextile* by the Romans ; and it has very improp-
" erly received the name of *leap-year* in this country, an
" appellation which might have been more appropriate had
" it consisted of three hundred and sixty-four days." And
the Encyclopedia Britannica remarks : " The English de-
" nomination of *leap-year* would have been more appro-
" priate if that year had differed from the common year in
" defect, and contained only three hundred and sixty-four
" days." While other learned pundits betray their per-
plexity by informing us that " The reason of the name of
" *leap-year* is that a day of the week is missed ; as, if on
" one year the first of March be on Monday, it will on the
" next year be on Tuesday, but on *leap-year* it will leap to
" Wednesday."

That the order of the Dominical Letters is not deranged

by the intercalation, and that their revolution is retarded so as to demand for its completion a period of twenty-eight years, will appear from an inspection of the letters adapted to the several years of the Solar Cycle ; the nature and uses of which will be the subject of the following chapter.

CHAPTER V.

IT was remarked above that the word *Cycle* is used in chronology to denote a portion of time, at the end of which events and phenomena return to the same position as at the beginning ; and that the calculations of the Church Calendar are founded, not directly on astronomical observations, but on the deductions from the two cycles— viz., the Solar Cycle and the Lunar, used by the ancients in the measurement of time. These cycles and their uses we are now to explain.

The Solar Cycle, or Cycle of the Sun, is a revolution of twenty-eight years, at the end of which the Sun's place returns very nearly to the same signs and degrees of the ecliptic on the same months and days. Now, as in the course of the Cycle the days, months and years have made one entire revolution, it is evident that the letters which denote the days and weeks and years of which the Cycle consists, will have made a corresponding revolution in the same time ; in other words, that at the expiration of the twenty-eight years, the days of the week will return to the same days of the year, and that the Dominical Letters, for leap-years as well as common years, will return again to the same days of the month. The return of the letters

may be easily verified without reference to the celestial phenomena; and as it is the letters, and not the measures of time which they represent, with which we are immediately concerned, we may safely dismiss all consideration of the astronomical fact, and regard the twenty-eight years simply as a cycle in which the Dominical Letters form a complete revolution; so that if they are continued in the same order, they will exactly repeat themselves. For all the purposes of the Calendar, therefore, the cycle is merely a cycle of the Dominical Letters, and is called the Solar Cycle, in the opinion of some, not with reference to the motion of the Sun, but from its repeating the letters which the Calendar assigns to *Dies Solis* or Sunday.

The following table exhibits the revolution of the Dominical Letters in the aforesaid cycle of twenty-eight years, the letters being arranged in a retrograde order, as explained above, and one letter being assigned to every common and two to every leap-year. In constructing the table, we may, of course, begin either with a bissextile or a common year; but in beginning with a bissextile, we follow the prescription of the author of the Paschal period.

The first column on the left represents a Cycle of twenty-eight years, and the second the Dominical Letters, or the letter corresponding to each year of the Cycle. There are several things in the table worthy of note: 1. The letters from the first year to the twenty-eighth follow one another in a retrograde order. 2. As five letters are assigned to every four years, so in the seven times four or twenty-eight years every letter is repeated five times; twice in combination with another letter, and three times alone by itself. 3. The same combination does not occur twice; G F, for example, which corresponds to the first year, is found nowhere else in the table. 4. But what is chiefly to be noted

TABLE A.

Showing the Dominical Letters as arranged for the Solar Cycle according to the Old Style of the Church Calendar.

is that the revolution of the seven letters in their retrograde order is exhausted, and if the Table were continued for another period of twenty-eight years, precisely the same phenomena would be repeated. For as the twenty-eighth year is the last of a quaternion, and is marked A, so the next year twenty-nine begins a new leap-year with G F (these letters being in the retrograde order

Years.	Dom. Letters.	Years.	Dom. Letters.
1	G F	29	G F
2	E	30	E
3	D	31	D
4	C	32	C
5	B A	33	B A
6	G	34	G
7	F	35	F
8	E	36	E
9	D C	37	D C
10	B	38	B
11	A	39	A
12	G	40	G
13	F E	41	F E
14	D	42	D
15	C	43	C
16	B	44	B
17	A G	45	A G
18	F	46	F
19	E	47	E
20	D	48	D
21	C B	49	C B
22	A	50	A
23	G	51	G
24	F	52	F
25	E D	53	E D
26	C	54	C
27	B	55	B
28	A	56	A

next to A), and the next cycle proceeds exactly as the last; as in the adjoining schedule on the right.

The process may be continued indefinitely, and always with the same results; whence it appears that the seven Dominical Letters, repeated one after another in a retrograde order, so that every fourth year shall have two letters, will make a complete revolution once in every twenty-eight years. On the supposition, therefore, that the Julian year of three hundred and sixty-five days and six hours is the true solar year, a table exhibiting the changes of the

letters for one period of twenty-eight years will enable us to ascertain what the Sunday Letter has been in any past year, or what it will be in any future year.

In order to apply the cycle to any particular era, it is only necessary to know what year of the cycle coincides with the first year of that era. The cycle is not specially adapted to the Christian era ; and in fact was in use long before the adoption of the Christian era. This era is said to have been introduced by Dionysius Exiguus, who dated its commencement from the seven hundred and fifty-third year of the building of Rome and the four thousand seven hundred and fourteenth year of the Julian period. Now that year was the *tenth* year of a Solar Cycle, and consequently in order to find the year of the cycle which answers to a given year of the Christian era, we must add *nine* to the given year and then divide by 28. The quotient will show the number of complete cycles that have elapsed since the birth of Christ, and the remainder, if there be a remainder, will show the year of the next cycle of which we are in search ; or if there be no remainder, 28 will be the year of the cycle. Thus, if I would know what are the Dominical Letters for the year 1580, I add 9 and divide the sum by 28, which gives me 56 for a quotient and 21 for a remainder. The year of the Solar Cycle, therefore, which corresponds to the year of Christ 1580, is 21 ; and turning to the Table, page 41, I find over against 21 the letters C B ; whence it appears that these were the Dominical Letters for the year 1580. Putting *m*, therefore, for the current year of the Christian Era, we have in general this formula : $\frac{m + 9}{28} = q + R$, in which R or 28, if R $= o$, shows the year of the Solar Cycle, opposite to which stands the Dominical Letter or Letters for the year *m*.

But observe that this applies only to the Old Style and not to the New Style of the Calendar, the peculiarities of which will be explained in their proper place.

The advantage of this system of literal notation may be seen in the Table on page 45, which is, in fact, a perpetual almanac. In using it, all that is necessary is to know the Sunday or Dominical Letter for the year; the figures in the column under that letter denote the Sundays of the year, while the figures to the right or left of the Sunday show respectively the week-days from Monday to Saturday, or from Saturday to Monday. The Table is adapted to the New Style as well as the Old; it is much used in verifying dates.

The principle on which this Table is constructed is found in the connection that subsists between the Sunday and week-day letters. The letters in the Table serve for both week-days and Sundays. The first day of each month is set under its proper letter, and as the days of the month grow from left to right by the addition of one, they, in like manner, fall each under its proper week-day letter; and as the days of the month grow from top to bottom by the addition of seven, each day falls in turn under a Dominical Letter. So that it is only necessary to know the Dominical Letter for a given year in order to ascertain the Sundays and consequently the week-days of every month in that year.

Two examples will show the use of the Table.

I have a manuscript sermon which purports to have been preached at "St. Michael's, Cornhill, London, August, 1730;" was it preached on a Sunday or on a week-day? The Sunday Letter for 1730, Old Style, was **D**; and under **D**, opposite to the month of August, I find 30, showing that the 30th of August in that year was Sunday.

TABLE

Showing the days of the month by the Sunday Letters, both for the Old and the New Style.

MONTHS.	A	B	C	D	E	F	G
JANUARY, OCTOBER.	1 8 15 22 29	2 9 16 23 30	3 10 17 24 31	4 11 18 25	5 12 19 26	6 13 20 27	7 14 21 28
FFBRUARY, MARCH, NOVEMBER.	5 12 19 26	6 13 20 27	7 14 21 28	1 8 15 22 29	2 9 16 23 30	3 10 17 24 31	4 11 18 25
APRIL, JULY.	2 9 16 23 30	3 10 17 24 31	4 11 18 25	5 12 19 26	6 13 20 27	7 14 21 28	1 8 15 22 29
AUGUST.	6 13 20 27	7 14 21 28	1 8 15 22 29	2 9 16 23 30	3 10 17 24 31	4 11 18 25	5 12 19 26
SEPTEMBER, DECEMBER.	3 10 17 24 31	4 11 18 25	5 12 19 26	6 13 20 27	7 14 21 28	1 8 15 22 29	2 9 16 23 30
MAY.	7 14 21 28	1 8 15 22 29	2 9 16 23 30	3 10 17 24 31	4 11 18 25	5 12 19 26	6 13 20 27
JUNE.	4 11 18 25	5 12 19 26	6 13 20 27	7 14 21 28	1 8 15 22 29	2 9 16 23 30	3 10 17 24

In old times historical and testamentary documents were often dated on the week-day preceding or following an immovable feast. In this case the above table is necessary in order to determine the day of the month.

Edward I of England was crowned, as appears by the record, on the Sunday after the Feast of the Assumption, 1274. Required the day of the month.

The Feast of the Assumption is the 15th of August, and the Dominical Letter for 1274 is G. Referring to the Table, we find that the first Sunday (G) after the 15th of August in that year is the 19th day of the month, which was consequently the day of the coronation.

On the Solar Cycle are founded the Tables which are given in treatises of Chronology and other works for finding the Dominical Letter both for the Old and New Style. Annexed is a Table showing the Dominical Letters for four thousand two hundred years after the birth of Christ, according to the Old Style.

To use the Table, look for the years under a hundred at the left side, and for the hundreds at the top. Follow the two lines, and at their angle of intersection you will find the Dominical Letter for the year.

An inspection will show that this Table, as respects the arrangement of the figures under 100, and as respects the arrangement of the centuries, is founded on the Solar Cycle; that is to say, on the fact that the letters go through all their changes in twenty-eight years, and that in every additional cycle of twenty-eight years they repeat themselves in the same order as in the first.

The figures under 100 are contained in the four columns at the left hand. If you read those figures from top to bottom you find that they increase by unity, and that each column (except the fourth which is broken by 99) contains

HUNDREDS OF YEARS AFTER CHRIST.

Years by which the given year exceeds the hundreds of years.				0 700 1400 2100 2800 3500	100 800 1500 2200 2900 3600	200 900 1600 2300 3000 3700	300 1000 1700 2400 3100 3800	400 1100 1800 2500 3200 3900	500 1200 1900 2600 3300 4000	600 1300 2000 2700 3400 4100
0	28	56	84	D C	E D	F E	G F	A G	B A	C B
1	29	57	85	B	C	D	E	F	G	A
2	30	58	86	A	B	C	D	E	F	G
3	31	59	87	G	A	B	C	D	E	F
4	32	60	88	F E	G F	A G	B A	C B	D C	E D
5	33	61	89	D	E	F	G	A	B	C
6	34	62	90	C	D	E	F	G	A	B
7	35	63	91	B	C	D	E	F	G	A
8	36	64	92	A G	B A	C B	C D	E D	F E	G F
9	37	65	93	F	G	A	B	C	D	E
10	38	66	94	E	F	G	A	B	C	D
11	39	67	95	D	E	F	G	A	B	C
12	40	68	96	C B	D C	E D	F E	G F	A G	B A
13	41	69	97	A	B	C	D	E	F	G
14	42	70	98	G	A	B	C	D	E	F
15	43	71	99	F	G	A	B	C	D	E
16	44	72		E D	F E	G F	A G	B A	C B	D C
17	45	73		C	D	E	F	G	A	B
18	46	74		B	C	D	E	F	G	A
19	47	75		A	B	C	D	E	F	G
20	48	76		G F	A G	B A	C B	D C	E D	F E
21	49	77		E	F	G	A	B	C	D
22	50	78		D	E	F	G	A	B	C
23	51	79		C	D	E	F	G	A	B
24	52	80		B A	C B	D C	E D	F E	G F	A G
25	53	81		G	A	B	C	D	E	F
26	54	82		F	G	A	B	C	D	E
27	55	83		E	F	G	A	B	C	D

twenty-eight places. If you read them sidewise or laterally, you find that they increase in every line by the addition of 28. And as the letters repeat themselves once in twenty-eight years, it follows that the same letters which answer for the year 1, answer also for the years 29, 57, and 85 ; that those which are proper for the year 2 are proper also for the years 30, 58, and 86 ; and so on for all the numbers under 100.

Examine the centuries and you find that if you read them laterally they proceed in an arithmetical series from 0 to 4100 ; and that if you read them from the top to the bottom they increase by the addition of 700. The reason of this arrangement of the centuries is that 700 (and, consequently, every number of centuries which is measured by 700, as 1400, 2100, &c.) is a multiple of 28, and is the first hundred which is a multiple of twenty-eight. And as it is the law of the Cycle that the letters repeat themselves in the same order in every twenty-eight years, it follows that at the expiration of seven hundred years the same letters return in the same order as at the beginning ; D C, for example, being the letters for the year 28, are also the letters for the years 700, 1400, and the other centuries in the first column ; and E D, being the proper letters for the year 100, are the same also for the centurial years which grow from 100 by the addition of 700. So with the other columns until you come to the bottom of the seventh column, where you have 4100, which, combined with the numbers under 100, will give you the Sunday Letters for four thousand one hundred and ninety-nine years. The Table may be continued indefinitely on the same principle.

As to the arrangement of the letters, it is only necessary to remember that the year 1 of the Christian era is, as above explained, the tenth year of the Solar Cycle. On re-

ferring to the Table, page 41, you find that the letter for the tenth year of the Solar Cycle is B. Hence, opposite to the year 1 in the Table of the Dominical Letters you have the Letter B. The year next before in the Cycle being a bissextile, has the two letters which precede B ; and these, taking the letters in the retrograde order, are D C, which are inserted for the sake of the centurial years from 700 to 3500. From B, therefore, as a nucleus, the letters proceed in the retrograde order throughout the Table. Whence it appears that a knowledge of the Solar Cycle is all that a man needs to enable him to construct a table of the Sunday Letters for any length of time.

Sometimes we have use for the Dominical Letters for the years before Christ. To construct such a Table, you arrange the figures the same as above, and take D C (calling the combination C D) for your starting point, and make the letters proceed in their *alphabetical* order, or the *reverse* of the order in which they proceed in the years *after* the Christian epoch. It is convenient to begin with D C, because it indicates a leap-year ; but this brings E opposite to the first year of the Christian era. Now the year in the Solar Cycle corresponding to E is 8 ; but as the first year of the Christian era is the tenth of the Cycle, so it is evident that the year next before is the ninth and not the eighth year of the Cycle ; and this is the reason why in using a Table of the Dominical Letters before Christ, you are always directed to subtract *one* from the year the letter of which you wish to find.

The few but important peculiarities which distinguish the New Style from the Old Style of the Calendar and affect its use, will be explained in a future chapter.

On the Solar Cycle are also founded the Solar Regulars and Concurrents, the names given to certain numbers which

are useful in verifying the dates of events which transpired while the Old Style of the Calendar was in vogue. A brief account of the functions of these numbers and the method of forming them, seems to be a fitting sequel to the present chapter. The reader who wishes to pursue the subject will find it treated with his usual copiousness of learning by Petavius in his " De Doctrina Temporum," lib. vi, c. 27. The various methods of forming the Solar Regulars there given, are an example of the exhaustive ingenuity which the learned of past ages have brought to bear on all matters connected with the Calendar.

The easiest and most simple way to form the Regulars is to assume the notation of the Calendar :

$$a = 1,\ b = 2,\ c = 3,\ d = 4,\ e = 5,\ f = 6,\ g = 7,$$

and then the figure corresponding to the letter of the first day of each month, increased by unity, is the regular of that month. Thus the first day of January is A, which is equal to 1 ; and $1 + 1 = 2$, so that 2 is the regular of January. The first letter of February is d, which is equal to 4 ; and $4 + 1 = 5$, hence 5 is the regular of February. When $g\ (= 7)$ is the first letter, the regular, as it cannot exceed seven, becomes one. Thus found, the Solar Regulars are as follows :

TABLE OF THE SOLAR REGULARS FOR EVERY MONTH.

JANUARY.	FEBRUARY.	MARCH.	APRIL.	MAY.	JUNE.	JULY.	AUGUST.	SEPTEMBER.	OCTOBER.	NOVEMBER.	DECEMBER.
2	5	5	1	3	6	1	4	7	2	5	7

The concurrents are the days which remain at the end of the year when the weeks are completed. A common year

has fifty-two weeks and one day over ; and a bissextile has fifty-two weeks and two days over ; the supernumerary days, one for a common year and two for a bissextile, are called *concurrents*, because they are used for chronological computations, in *concurrence* with the Solar Cycle in the manner which we are about to explain.

In collecting these concurrents for a series of years, it is to be noted that they increase at the rate of one a year for the common year and two a year for the bissextile years. As the changes of the letters, in the Julian Calendar, are exhausted in the course of twenty-eight years, it is only necessary to collect them for that Cycle in order to adapt them to perpetual use in the said calendar ; and as the object in collecting these concurrents is to connect them with the days of the week, they are not suffered to exceed 7 in number, but are made to repeat themselves from 1 to 7 throughout the Cycle ; so that each year of the Cycle has its own concurrent, as may be seen in the following Table :

TABLE OF THE CONCURRENTS, WITH THE SEVERAL YEARS OF THE SOLAR CYCLE.

Solar Cycle.	Concurrents.	Solar Cycle.	Concurrents.	Solar Cycle.	Concurrents.	Solar Cycle.	Concurrents.	Solar Cycle.	Concurrents.	Solar Cycle.	Concurrents.	Solar Cycle.	Concurrents.
I.	1	V.	6	IX.	4	XIII.	2	XVII.	7	XXI.	5	XXV.	3
II.	2	VI.	7	X.	5	XIV.	3	XVIII.	1	XXII.	6	XXVI.	4
III.	3	VII.	1	XI.	6	XV.	4	XIX.	2	XXIII.	7	XXVII.	5
IV.	4	VIII.	2	XII.	7	XVI.	5	XX.	3	XXIV.	1	XXVIII.	6

The first year is accounted a bissextile ; and after that it will be observed that the concurrents increase every fourth year by 2 and every other year by one, until they amount to 7, when they return to 1.

Now, with these Tables before us, having the month and the day of the month for a given year, we first find the year of the Cycle corresponding to the given year ; then we have only to add the regular of the month to the concurrent of the year, and the sum, if less than 7, gives us the day of the week on which the said month began ; or if the sum be more than seven, then subtract seven from it, and the remainder is the day of the week on which the month began ; the days being numbered Sunday 1, Monday 2, Tuesday 3, Wednesday 4, Thursday 5, Friday 6, and Saturday 7.

The following examples will illustrate the use of these numbers :

The massacre of the ten thousand French at the Sicilian Vespers was on March 20th, 1282.   What was the day of the week ?

Divide 1282 + 9 by 28 and you have a remainder of 3. The year of the Cycle, therefore, is III, the concurrent of which is 3.   The regular for March is 5, which, added to 3, is 8 ; and $8 - 7 = 1$; which shows that March on that year (1282) began on Sunday, consequently the 20th was Friday, which in that year was the Friday following what is sometimes called Passion Sunday.

The Parliament for the third year of Richard the Second, A. D. 1379, met on the Monday next after the Feast of St. Hilary.   What day of the month should the modern historian assign to the meeting ?   The Feast of St. Hilary is January the 13th.

The Concurrent of 1379 is 5, and the Regular of January is 2 ; and $5 + 2 = 7$ shows Saturday to have been on that year the 1st day of January.   The 13th, therefore, was Thursday, and the Parliament met on the 17th day of January.

CHAPTER VI.

WE have seen that notwithstanding the intercalation of a day once in four years, the Church limits the days of the leap-year as well as the common year to 365, and have shown the inconveniences that would result if the day in excess in the leap-year were counted as a Calendar day. We have seen also that the intercalary day was inserted next after the sixth day before the Calends of March, so as to make a first sixth and a second sixth, each having *f* for its proper letter. The sixth day before March is in our account the 24th of February, and is the Feast of St. Matthias ; and hence the 24th and 25th, being, in fact, one and the same Calendar day, have the letter *f* in common.

Hence arise two questions : The first is as to the length of the month of February in leap-years, and the second as to the day of the month on which in a leap-year the Feast of St. Matthias ought to be celebrated.

In regard to the first question, there can, I think, be no room for anything more than a verbal dispute. For if we admit that the Church limits the leap-year to three hundred and sixty-five Calendar days, and makes the intercalated day in February to be one and the same with the day

next to which it is intercalated, then undoubtedly the month of February has never more than twenty-eight days ; and that the Church in fact assigns to February only twenty-eight days, and never allows twenty-nine days for the leap-year, is a point which, as will soon appear, admits of indisputable proof.   Hence as respects the Church Calendar the old canon is correct :

> Thirty days hath September,
> April, June, and November ;
> February has twenty-eight alone,
> And all the rest have thirty-one.

While the other and more common rule :

> February alone hath eight and a score,
> And every leap-year we give it one more,

is evidently adapted to secular and not to ecclesiastical computation.

To this I may add that a certain friend (who shall be nameless) and his son, who were each born on the 29th of February, and all other churchmen who are in the same predicament, have no right to complain that they can celebrate their birthday only once in four years.   For if they follow the Church's reckoning, which recognizes no such day as the 29th of February, they may be sure that they were born—albeit in leap-year—on the 28th of February, and that consequently the 28th is the anniversary of their birth.

To this statement it may be objected that the Prayer Books, both of Great Britain and the United States, make the February of the leap-year to have twenty-nine days. This is not quite correct ; for although our present Prayer Books, unlike those of older date, do not regard the twenty-fourth and twenty-fifth days of February as one, but assign to them different letters, yet they do not assign to the 29th

of February *a letter of its own*, but either leave it without
a letter, or, without authority, borrow for it either the
letter of the 28th of February, or that of the 1st of March,
thus making the day appear to a superficial observer to be
what it is not—viz., a Calendar day. After all, however,
by printing the day without a letter of its own, our modern
editors assert the principle of the Calendar ; and the point
on which they differ from what I believe to be the more
correct usage, is that they make the intercalary day to be
the 29th of February instead of the 25th ; thus giving us
a bissextile year which is, literally at least, *not* a bissextile.

It is true, indeed, that our modern editions of the Prayer
Book, both English and American (Mr. Blunt's Annotated
Prayer Book is no exception), besides giving, as most of
them do, without authority, a letter to the 29th of Febru-
ary, expressly declare, in large letters at the head of the
month, that *February in leap-year has twenty-nine days.*
When and by what authority this declaration was first
introduced, or by what authority it is continued, I am un-
able to discover. That the declaration is contrary to the
principle on which the Calendar is constructed, has been, I
think, already shown ; and all the old authorities that have
come under my observation, rule with one accord that Feb-
ruary has twenty-eight days ; never more.

The statute *De Anno Bissextili*, 21 Henry III, enacted
at Westminster A. D. 1236 (as quoted by Dr. Nicholls), is
very explicit :

" To take away from henceforth all doubt and ambiguity
" that may arise hereafter, the day increasing in the leap-
" year shall be accounted for one year [day ?], so that
" because of that day none should be prejudiced, that is
" impleaded, but it shall be taken and reckoned of the
" same month wherein it groweth, and that the day and

" the day next going before, shall be accounted for one and
" the same day."

Here the intercalary day is expressly said to *increase*
and *grow,* and to be *one and the same* with the day next
before it, and out of which it is supposed to grow. It is
obvious to infer that the rule of the Church was at that
time undoubted, and that the design of the statute was to
apply the same rule to secular purposes.

If we refer to the authorized editions of the Prayer Book,
we find the results to be as follows : In the first book of
Edward VI, the Calendar for every month is printed with
only the name of the month at the head of the page ; but
in every subsequent revision the names of the months are
printed at the top of the page, together with the number
of days they severally contain. And what number of days
do they assign to February ? The second book of Edward
VI, 1552, says, " February hath XXVIII days ; " the re-
vision of Queen Elizabeth, 1559, the same ; that of Hamp-
ton Court Conference, 1604, and the Scotch Liturgy, the
same ; and that of the Savoy Conference, the same. Thus
of the six authorized revisions, one is silent on the point,
and five declare expressly " February hath XXVIII days,"
without a word to show that the leap-year differs in this
respect from the common year.

Thus much in reference to the heading which is placed
over the month ; if we look next at the column in the Cal-
endar which numbers the days and prescribes the lessons
for each day of the month, we find that the First Book of
Edward the Sixth and all the subsequent Revisions, with
only one exception, assign to February only twenty-eight
days. The exception is the revision of 1662, which was the
first to introduce the 29th in the column for February, and
to assign proper lessons for that day. But the authors of

the revision, like all who preceded them, evidently regarded the 29th as a natural, and not as a Calendar day ; for they give it no letter but leave a blank where others have taken upon them to insert a letter which does not belong to the day ; and at the head of the month they tell us that February hath twenty-eight days ; they did not add, "And in "every leap-year twenty-nine days," and *they* could not make this addition, for the simple reason that they were incapable of using the same word, in the same breath, in two different senses.

I have dwelt the longer on this point because of its connexion with the question touching the proper day in leap-years for observing the Feast of St. Matthias—a question which was the subject of a curious and very learned controversy in our mother Church in the early part of the last century. The feast is observed in common years on the 24th of February ; but as the intercalary day in the leap-year was believed to grow out of the 24th, and to be in effect one with it, the question was naturally mooted whether the saint who was himself intercalated, as it were, among the Apostles, should be commemorated in the leap-year, on the 24th or the 25th of the month. The opinion of some eminent ritualists, long before the Reformation, is said to have been given in favour of the 24th, but both the law and the custom of the Church seem to have determined the question very generally in favour of the 25th. Dr. Nicholls, the second edition of whose folio on the Common Prayer was published in 1712, tells us that the feast had been observed in leap-years on the 25th of February for more than five hundred years before and since the Reformation ; and he adds that it continued to be so observed in the Church of England for more than twenty years after the last revision of the Prayer Book (1662) ; but that in

the year 1683 a mandate was issued by the then Arc̣
of Canterbury requiring the feast to be observed " ᴵᴺ ᵗᴴᴱ
" 24th of February forever, whether it be leap-year or
" not ;" " since which time," says Dr. Nicholls, " some
" complying with it (the above-mentioned mandate), others
" neglecting it, strange confusion has happened in the leap-
" years."

The said order of the Archbishop of Canterbury requires
all vicars and curates to take notice, " That the Feast of
" St. Matthias is to be celebrated (not upon the 25th of
" February, as the common almanacs boldly and erro-
" neously set it), but upon the 24th of February forever,
" whether it be leap-year or not, as the Calendar in the
" Liturgie, confirmed by Act of Uniformity, appoints and
" enjoins.

" Given at Lambeth House, Feb. 5th, A. D. 1683.
                                    " W. CANT."

Before another leap-year came round occurred the Revo-
lution ; when the Archbishop (Sancroft) was suspended
from his office in consequence of his refusal to take the
oath of allegiance to William and Mary. On the order of
Archbishop Sancroft, Dr. Nicholls remarks :

" What force this order might have had (had it been
" legally grounded) during the government of that Arch-
" bishop, I shall not dispute. But I think it can have
" little now ; especially if we consider that it is an order
" contrary to the law of the land, to the canons of the
" Church, and the immemorial practice thereof, to all the
" rules of ecclesiastical chronology, and even to the very
" calendar of the Liturgy which it vouches in its behalf."

I have no intention to go into the details of the contro-
versy. The reader who wishes to examine them may con-

sult Nicholls and Wheatly on the Common Prayer, the
learned John Johnson's Vade Mecum, vol. i, pp. 214–217,
and p. 378, and a treatise (which I have never seen) written
expressly on the subject by Dr. John Wallis, the famous
Savilian Professor of Geometry at Oxford. Dr. Wallis,
who was a member of the Savoy Conference, as well as
Archbishop Sancroft, takes the opposite view to the Arch-
bishop, and agrees on this point with Dr. Nicholls. John-
son is not positive ; for having argued somewhat doubtfully
in favour of the 24th, he concludes as follows : " Therefore
" I should think I had reason to adhere to the emendation
" made by my venerable patron, Archbishop Sancroft, in
" this point, had not Dr. Wallis assured us that the Arch-
" bishop, by the discourse of himself and others on this
" subject, was satisfied it was his mistake ; and that if he
" had continued Archbishop, and in good circumstances,
" till another leap-year, he would have reversed his former
" order and directed the Almanacs to be printed as for-
" merly." Wheatly, however, referring to Dr. Wallis's
statement that Archbishop Sancroft had changed his opin-
ion on the subject, remarks : " But this I conceive to be
" only a presumption of the Doctor's."

In my opinion (for according to the adage " When doc-
" tors disagree," etc., a disciple may be permitted to ex-
press an opinion), Dr. Nicholls has satisfactorily sustained
the several weighty objections which he makes to Arch-
bishop Sancroft's order. Wheatly had the advantage of
writing after Dr. Nicholls, but he has failed, I think, to
meet his objections. To some extent the argument turns
on the question whether the 29th of February, which was
first inserted by the Savoy Conference, was or was not in-
tended by the Conference to be the intercalary day. Dr.
Nicholls had remarked : " The last reviewers set down 29

" in the outward column and placed lessons against it,
" which might be read in the bissextile (or leap-year) ; and
" thus every day had its lesson against it, and everything
" was plain.   But at the same time they are so far from
" making this the intercalary day, that they do not make
" it any day at all ; for there is no weekly letter set against
" it.   For *d* being the letter for the 1st of March, *c* is
" placed as the immediate day before it, over against 28,
" and collateral to it *Prid. Kal.*, by which it is plainly
" shown that 29 is not the intercalary day, for then there
" would be another *c* added ; but a blank being left in
" these two odd columns, it is manifest that every letter
" after St. Matthias must be drawn a day lower in the bis-
" sextile, to give way for a second *f* to be inserted there."

To which plain and unanswerable statement of facts,
Mr. Wheatly offers in reply the following suppositions :
First he supposes that the last reviewers of our Liturgy,
" observing that the 29th of February was in our civil
" computation generally looked upon as the intercalary
" day, they thought that it would be more uniform ❊ ❊ ❊
" to make it so also in the ecclesiastical computation."
And then he adds, that " whereas *f* used to be doubled at
" the twenty-fourth and twenty-fifth days, *c*, which is the
" Dominical Letter for the twenty-eighth day, or else *d*,
" which is that for the 1st of March, is now supposed to be
" repeated on the 29th."

I infer, from what Mr. Wheatly says, that there was in
his time a growing disposition on the part of churchmen to
substitute the civil for the ecclesiastical computation, and
that thus the 29th of February came to be regarded as the
intercalary day in compliance with the civil use, though in
violation of the principles of the calendar.

On the whole, then, I am apt to think, as regards the

proper day for observing the Feast of St. Matthias in leap-years, that the case is one in which the Church has ruled one way, and a convenient compliance with the custom of the world has drawn us the other way. Not that I would by any means recommend a return to the old and, as I believe, the authorized custom ; for the main point to be aimed at in a case of this sort is uniformity ; and the observance of the 24th every year by common consent for more than one hundred and fifty years, is itself a custom which ought not to be set aside by individuals acting on their own notion ; least of all in a case which, like the present, is open to argument, and not ruled by the express letter of ecclesiastical law. If, indeed, the time predicted by our old divines as an inevitable consequence of the captious opposition of the Puritans to the Anglican Reformation should ever come, when we shall once more fall under the sway of the Roman Pontiff, then we shall return to the old usage ; the Roman offices requiring the feast to be observed in leap-years on the 25th of February, and the present breviaries having as a running title for the Feast of St. Matthias, " Die xxiv vel xxv Februarii," and expressly directing that the feast shall be celebrated on the 24th in common years, and on the 25th in a leap-year.

CHAPTER VII.

The Lunar Cycle—Difficulties in adjusting the Lunar to the Solar time—
Expedients adopted by the Romans, and by the Greeks—The discov-
ery of Meton—Explanation of the Metonic Cycle and of the Julian
Epacts—The Hebrews, their facilities for harmonizing the Solar and
Lunar time—No Astronomical Cycle until after their dispersion.

IN secular matters men regulate their affairs by the time
of the sun, whose diurnal revolution makes the alter-
nation of day and night, and whose annual revolution
causes the change of the seasons, and influences the busi-
ness of life, which varies as the seasons vary. But not so
in sacred matters; for we find that among all the nations,
ancient and modern, with which we are best acquainted,
the Festivals of Religion have been regulated by the course
and changes of the moon. So it was among the ancient
Hebrews, Greeks, and Romans; and so it is at this day
among Christians. Now if the twelve lunar months were
exactly equal to a solar year, so that the lunar and solar
years always coincided, then the lunar festivals appointed
for one year would hold the same relation to the sun in
every following year, and consequently occur in the same
season of the year as when they were first appointed. In
fact, however, the twelve lunar months are equal to only
three hundred and fifty-four days, and thus fall short by
about eleven days of the solar year. The consequence is
that they who appointed a feast to be held at the full

moon at any given season of the year—say about the vernal equinox—would, if they followed only the lunar time, find themselves in the course of a few years celebrating the same feast in the winter instead of the spring.

The difficulty is one with which all nations have had to contend, and which they adopted various expedients to remedy ; the most obvious of which is that of intercalating in a series of years as many lunar months as shall be equivalent in that series to the excess of the solar over the lunar time.

Plutarch, in his life of Numa Pompilius, tells us that the Romans, before Numa's time, "had no notion of the "difference between the motions of the sun and the moon ; "only that they kept to this account that the whole course "of the year contained three hundred and sixty days." "But Numa," he adds, "observing that there was eleven "days' difference between the lunar and the solar year, for "that the moon completed her anniversary course in three "hundred and fifty-four days, and the sun in three hun- "dred and sixty-five ; to remedy this inequality, he dou- "bled the eleven days, and every other year he added an "intercalary month of two-and-twenty days, which the "Romans called the month of Mercedinus." Livy (lib. i, c. 20) tells us that the effect of Numa's intercalation was that in every four-and-twentieth year the days of the lunar year and those of the solar year coincided. And Macrobius (quoted by Twiss on Livy *loc. cit.*) informs us that the Calendar was skilfully arranged by Numa, but was after- wards thrown into disorder by the carelessness and ambi- tion of the Pontiffs, to whom the work of intercalation was entrusted, and who, for political ends and in the interest of office-holders, used sometimes to shorten and at other times to prolong the year at their pleasure. The conse-

quence was that the Calendar, in spite of all former correc-
tions, had become, in the time of Julius Cæsar, so confused
that, to use the words of Suetonius in his life of Cæsar,
" neither the harvest holydays fell out in summer nor the
" vintage in autumn."   Cæsar, as we have said, abolished
the lunar reckoning and accommodated the year to the
course of the sun, adding one day in every four years to
the three hundred and sixty-five days before in use.   The
extent of the disorder which he undertook to remedy may
be inferred from the fact that in order to set the Calendar
and prepare, as it were, for a new start, he was obliged to
make the first year of the new Calendar consist of fifteen
months ; a year which was long remembered and known as
" the year of confusion."

The Greeks had to contend with the same difficulties,
and it is to their ingenuity that we are indebted for the
best way of obviating them.   They had been directed by an
oracle to observe all their solemn sacrifices and festivals
κατα τρια, *according* to *three ;* i. e., as they understood the
oracle, according to *years* as reckoned by the sun and ac-
cording to *months* and *days* as reckoned by the moon ; in
other words, to celebrate their festivals, as nearly as possi-
ble, at the same *season* of the year, and at the same moon
(or lunar month) and day of the moon.   The difficulty of
following the direction is apparent ; for the new moons and
full moons of every year falling about eleven days earlier
than on the year next before, the seasons, of course, seemed
to be constantly receding, so that the festivals which should
be held in the summer were in danger of being held in the
spring or winter.   The confusion was particularly felt in
regard to the Olympic games which were appointed to be
held every fourth year on the full moon next after the
summer solstice.   All classes of society were interested in

the games, the observance of which depended on the course
of the moon ; and all classes likewise were interested in
agriculture and other pursuits of life which were regulated
by the sun and the changes of the seasons. Hence the ne-
cessity of so adjusting the Calendar that the full moon on
which the games were to be celebrated might not part com-
pany with the summer solstice ; and that they who super-
intended the games might know the day beforehand, so as
to send due notice of it to all parts of the country.

After sundry attempts at intercalation by means of a
cycle of two years and afterwards of four years, the regula-
tion was adopted, which continued some time in force, of
inserting three months in the Calendar once in eight years.
For assuming that the excess of the solar year over the
lunar is eleven and a quarter days, the excess in eight years
$(8 \times 11\frac{1}{4} = 90)$ would amount to ninety days ; so that if
three months of thirty days each were intercalated once in
eight years, the solar and lunar years would nearly coincide.
The difference would be a little more than three days in
sixteen years, which was sought to be obviated afterwards
by cancelling one of the intercalary months in every one
hundred and sixty years.

In " The Clouds " of Aristophanes, we have an amusing
proof of the derangement of the affairs of the state conse-
quent upon the irregularities of the Calendar. The Clouds
inform the audience that they met the Moon [Diana] and
were charged by the goddess to say to the people of Athens
that notwithstanding all the benefits she had conferred on
them, some of which helped to fill their pockets, since she
had illuminated their streets *gratis* these many years, and
so saved them the expense of torchlight, they yet most un-
gratefully disordered her feasts and made her odious to the
other gods, who used to rate her roundly because they were

5

often cheated out of their dinner and compelled to go home without regaling themselves on their feasts at the times appointed. Moreover, she adds, when you ought to be offering sacrifice, you are punishing criminals and busy in lawsuits ; and while we gods are fasting and mourning perchance for Memnon or Sarpedon, you, forsooth, are pouring out libations and making merry. And she intimates, in conclusion, that the gods had lately deposed one of the Athenian Rulers of the Feasts, to give them a lesson and teach them better how to spend their time in future according to the Moon.

Thus the perplexity of the rulers and the confusion of the people were made the butt of ridicule by the wits of the day. In the present instance, however, both rulers and people were probably in a humour to bear the ridicule with complacency, inasmuch as it reflected only on their former ignorance, and was thus a tacit compliment to them on their proficiency in knowledge. For the second and successful representation of The Clouds is assigned by the critics to the year B. C. 424, eight years after the time (B. C. 432) when the Athenians had voted a crown of gold to Meton for the invention of his famous lunar cycle, which at once superseded all former cycles, and promised to relieve the Greeks from future embarrassments and enable them to bring their secular and ecclesiastical years into agreement.

For Meton had happily discovered, or at least he was the first to proclaim among the Athenians, that in a cycle of nineteen years the conjunctions and oppositions of the moon and the sun—in other words, the new moons and the full moons—happen at the same points of solar time, or rather on the same days in every year of the cycle in which they happened in the

same year of the cycle preceding it. Hence Meton assumed
for his cycle the period of six thousand nine hundred and
forty days, which is a fraction more than the number of
days in nineteen solar years. This number of days, divided
by $29\frac{1}{2}$, the average number of days in a moon or lunar
month, is equal to two hundred and thirty-five moons, with
a fraction over. Nineteen lunar years of twelve months
each are equal to two hundred and twenty-eight lunar
months, so that if we intercalate seven moons, six of thirty
days each and one of twenty-nine, in the course of the
nineteen years we have the two hundred and thirty-five
lunations, which are commensurate with the nineteen solar
years. To explain : let the Roman figures in the following
Table stand for the solar years from one to nineteen, and
the Arabic for lunar months and days :

11	22	1+3	14	25	1+6	17	28	1+9	20
I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.

1+1	12	23	1+4	15	26	1+7	18	0
XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII.	XIX.

In this schedule, each Roman numeral represents the
termination, and not, as in the New Style of the Calendar,
the commencement of a year. Let us suppose, then, that
the cycle begins from a new moon on the 1st of January ;
then on the 1st of January following there will have
elapsed one solar year of three hundred and sixty-five full
days. Denote this solar year by the Roman numeral I.
In the same time there will have been twelve moons of
twenty-nine and a half days each and eleven days over.
Set the 11 in Arabic figures over the I, to show that at the
end of the first year of the cycle the moon is eleven days
old. At the end of the second solar year there will have
elapsed another lunar year of twelve moons and another
eleven days, which, added to the former, will make twenty-

two days. Write II in Roman and set over it in Arabic 22, to denote the age of the moon at the end of the second year of the cycle. At the end of the third solar year there will have been another lunar year and eleven days over ; and the eleven added to the twenty-two days, which was the age of the moon at the end of the previous year, makes thirty-three, or one month and three days. Write III in Roman and set over it in Arabic $1 + 3$; to show that at the end of the third solar year there have been three lunar years and one moon of thirty days, and that the moon is then three days old. Proceed in the same way throughout ; that is, in order to get the age of the moon at the beginning of every new year of the cycle add eleven to the age of the moon at the beginning of the previous year. If the sum is less than thirty, it shows the age of the moon at the beginning of the year ; if the sum is more than thirty, count the thirty for one month, and the excess above thirty will show the age of the new moon ; and the number which thus shows the age of the moon at the beginning of each new year of the cycle is called the EPACT of that year. Hence it appears that the intercalation is no arbitrary or fictitious process, but simply a representation of the actual conformity of the lunar to the solar time ; and that an intercalated moon is merely a moon which is not included in the reckoning of the preceding lunar year. In short, the Table shows the relation of the moon to the sun at the beginning of every year, and thus furnishes the computist with the *data* for showing the agreement of the solar and lunar time through the remainder of the year.

With the help of this cycle it was easy to construct a table for nineteen years to show on what day next after the summer solstice the moon would be full in each year. The same table would answer for every successive cycle of nine-

teen years ; and the number of the year of the cycle being set opposite to the day of the full moon that falls next after the summer solstice, served to designate the day on which the Olympic games began. This number was called the golden number ; either from the crown of gold which was awarded to Meton for his discovery, or from the scheme of the festivals being inscribed on a marble pillar in letters of gold, or from its great utility.

The cycle of Meton, though superior to all that preceded it, and more useful than any other that was afterwards contrived, failed notwithstanding to fulfil the expectations it had excited. The period of six thousand nine hundred and forty days contains six hours more than nineteen years of three hundred and sixty-five and a quarter days ; and in the course of a hundred years the difference became so perceptible as to call for a further revision of the Calendar. Then it was (B. C. 330) that Calippus, a famous astronomer of that age, invented his period of seventy-six years (consisting of four Metonic cycles), which was held in great repute in the decline of the Grecian Commonwealth, and to which, in another aspect of the subject, we shall again have occasion to refer.

The Hebrews, by God's special appointment, regulated their chief festivals by the course of the Moon. " He ap-" pointed the Moon for seasons," as the authorized version, or " for certain seasons," as the Prayer Book reads. The original, however, may be rendered : " God made the Moon " for the congregations or meetings " of His people with Him on their solemn feast days ; and the same destination of the Moon in the divine purpose is expressed more fully in the Book of Ecclesiasticus (xliii, 6, 7) :

" He made the Moon also to serve in her season, for a " declaration of the times and a sign of the world ;

"From the Moon is the sign of the Feasts ; a light that "decreaseth upon her perfection." *

Accordingly we find that their divine lawgiver appointed the Passover to be held on the 14th of the Month Nisan or Abib—the first month of the sacred or lunar year—about the time of the vernal equinox, when the moon was in "her "perfection," and before she began to wane. The adaptation of this and its dependent feasts to the habits of an agricultural people, the very rites they were required to perform—as, for example, the offering of the first fruits of the wheat harvest at Pentecost, being connected with the several seasons of the year—made it imperatively necessary and comparatively easy for the Israelites to adjust the lunar to the solar year. In fact, they simply intercalated a lunar month whenever they found it necessary ; generally, as we have said, once in three or seven times in nineteen years.

Confined to the narrow boundaries of Palestine, and having no occasion to extend the notice of their feasts beyond these geographical limits, or to forecast them for a series of years, the Hebrews did not trust to the results of astronomical observation. Not that they were unskilled in astronomy ; for the various phases of the moon pictured on the walls of the Sanhedrim proved the absorbing interest which their elders felt in this branch of the science, and their proficiency in it also after the fashion and measure of the times in which they lived. But the judges considering the sacred importance of the subject to the nation, though they well knew when the new moon would appear, yet, out of abundant care, were unwilling to announce the fact, except on the positive testimony of at least *two* credible witnesses. If, from the state of the atmosphere or other cause, the *phasis* or first appearance of the moon could not

---

* See the original and Arnald's note.

be proved from ocular testimony, the Feast of the New Moon was nevertheless appointed by the Sanhedrim and observed ; only it was not consecrated, the consecration depending under the law on the PHASIS.* The method of determining the fact pursued in the later times of their polity attests probably their ancient practice. Towards the end of every month the Sanhedrim sent out persons to the highest places about Jerusalem to watch for the first appearance of the new moon, and when they had discovered it, to return and make their report. Great care was taken in examining the witnesses ; and the authorities, when satisfied of their accuracy, noted the fact with much solemnity, and having publicly proclaimed in Jerusalem " The Feast of the New Moon ! " The Feast of the New Moon ! immediately telegraphed the news, by means of beacon-fires from mountain to mountain to all parts of Judea ; and to the new moons and full moons all their other feasts were adjusted.

But after the dispersion of the Jews, consequent on the Babylonian captivity, this method became impracticable, and they were compelled to resort to the use of astronomical cycles in order to maintain among themselves a uniformity of practice. Those of the Hebrews who settled east of the Euphrates probably availed themselves of the facilities afforded for this purpose by the Chaldean astronomers.† But in regard to the Jews of the dispersion in Alexandria and Antioch, and the other cities of Egypt, Syria, and the lesser Asia, it is certain, says Prideaux, that

---

* Con. Lewis Heb. Antiq. and Alexander's Heb. Ritual.   London : A. M. 5579.

† " It has been suspected," says Dr. Hale, " and not without foundation, that the celebrated lunar cycle of 19 years, which Meton introduced into Greece, for the adjustment of their lunar year with the solar, was borrowed from the ancient Jewish tables."

they used in the adjustment of their Calendar the cycle of
eighty-four years ; inasmuch as " several of the fathers of
" the Christian Church mention this cycle as one that had
" been used by the ancient Jews, and was afterwards bor-
" rowed from them by the primitive Christians, for the
" fixing of the time of their Easter." Now, as the subse-
quent history of this cycle is somewhat curious, especially
in connexion with the Roman and ancient British churches,
it may be well to note the account which Prideaux gives
of its origin. " It seems," he says, " to have been made
" up of the Calippic cycle and the octoeteris (or eight
" years cycle) joined together." And shortly after, the
same author adds : " That they (the Jews) might not
" seem to have anything among them relating to their
" religion, which was of Heathen usage, they added the
" octoeteris to this period of seventy-six years, and thereby
" making it a cycle of eighty-four years, by this disguise
" rendered it wholly their own ; for no other nation but
" the Jews alone used this cycle, till it was borrowed from
" them by the primitive Christians for the same use, that
" is, to settle the time of their Easter. But the Jews by
" this addition rather marred than any way mended the
" matter. For although the period of Calippus fell short
" of what it intended, that is, of bringing the motions of
" the two greater luminaries to an exact agreement, yet it
" brought them within the reach of five hours and fifty
" minutes of it. But the addition of the octoeteris did set
" them at the distance of one day six hours and fifty-one
" minutes. However, this they used till Rabbi Hillel's
" reformation of their Calendar, which was about the year
" of our Lord 360."

CHAPTER VIII.

Early observance of Easter in the Christian Church—The Quartodeciman controversy—Subsequent disagreement as to what Sunday should be accounted Easter day—Causes of the want of uniformity—Decision of the Council of Nice—The Metonic Cycle used by the Alexandrian Church—Vacillation of the Roman Church, and its effect on the British Churches.

THERE is no good reason to doubt that the annual, as well as the weekly, commemoration of our Lord's Resurrection, was observed by His followers from the time of the Apostles. The first dispute among the early Christians respecting the time of its observance, interesting in other respects, is full proof that, so early as the second century, the annual Feast was universally celebrated in the Church and accounted an ancient custom. The question was whether Easter should be celebrated on the same day on which the Jews were commanded to kill the paschal lamb, i. e., the fourteenth day of the first lunar month of the year on what day soever of the week it chanced to fall, or on the Sunday that next followed that day. The churches generally, and particularly the Western churches, observed the feast on the first Sunday after the full moon; while the churches of Asia Minor, pleading the prescription of St. John, observed it on the day of the full moon. Several synods of the West had united in a decree, " that the mys-" tery of our Lord's Resurrection should be celebrated on " no other than the Lord's Day." When this decree was published, Polycrates, in behalf of himself and the other bishops of Asia, addressed a letter to Victor, the then Bishop of Rome, in defence of the Eastern tradition.

" Whereupon," says Eusebius, " Victor, the Bishop of the
" Church of Rome, forthwith endeavoured to cut off the
" churches of all Asia, together with the neighbouring
" churches, as heterodox, from the common unity." But
Victor was not sustained in this extreme measure by the
Bishops of the West. Irenæus, in particular, in the name
of his brethren in Gaul, addressed to him an epistle, in
which, though he maintains the duty of celebrating Easter
only on the Lord's day, yet " becomingly also admonishes
" Victor not to cut off whole churches of God, who observed
" the tradition of an ancient custom." In further pressing
on Victor the duty of preserving communion with those
who differed from him on this point, Irenæus adds : " And
" when the blessed Polycarp went to Rome in the time of
" Anicetus (a predecessor of Victor in the See of Rome),
" and they had a little difference among themselves like-
" wise respecting other matters, they immediately were
" reconciled, not disputing much with one another on this
" head. For neither could Anicetus persuade Polycarp
" not to observe it, because he had always observed it with
" John the disciple of our Lord, and the rest of the Apos-
" tles with whom he associated ; and neither did Polycarp
" persuade Anicetus to observe it, who said that he was
" bound to maintain the practice of the presbyters before
" him. Which things being so, they communed with each
" other ; and in the Church Anicetus yielded to Polycarp,
" out of respect no doubt, the office of consecrating, and
" they separated from each other in peace, all the Church
" being at peace ; both those that observed and those that
" did not observe, maintaining peace." The result proved
the wisdom of Irenæus's course in matters non-essential ;
the quartodeciman dispute soon expired ; and the Asiatics
yielded to conciliation and reason a point for which they

had stiffly contended in opposition to the ill-judged zeal
and menaces of Victor.*

But besides the dispute of the Western Christians with
the Quartodecimans (as they were called who observed
Easter on the fourteenth day of the Paschal Moon), there
was another source of difference as to the time of Easter,
which, though of less importance, continued for a much
longer time to trouble the Church. For admitting that
Easter should be commemorated annually on the Lord's
day, it was not easy to determine the particular Lord's day
which should be observed for the purpose. In fact, it
sometimes happened that the churches of one country kept
their Easter a week, or even a month, earlier than the
churches of another country. Anatolius, who flourished in
the third century, explains the reason of this diversity,
when he complains " That there were very different and
" contrary cycles in use in his time ; some following Hip-
" polytus's cycle of sixteen, others the Jewish cycle of
" eighty-four, others a cycle of twenty-five, others a cycle
" of thirty years." In every one of these cycles Easter was
marked as falling on every year of the cycle, on the same
day on which it fell before on the same year of the same
cycle ; and the metropolitans, whose duty it was to give
notice of Easter to the churches under their charge, ap-
pointed Easter to be held on the day indicated by their
respective cycles ; and as the cycles differed in the designa-
tion of the day, so also did the metropolitans. The temper
of the Church at large in regard to these differences was
probably the same as that of the historian Socrates, who
justly remarks (book v, c. 22) that " Neither the Apostle
" (St. Paul) nor the Evangelists have anywhere imposed
" the yoke of servitude on those who have embraced the

* See the interesting account in Eusebius, book v, chap. 23, 24.

" gospel, but have left Easter and every other feast to be
" honoured by the gratitude of the recipients of grace."
But Christian gratitude naturally recoils from deformity
and confusion, and seeks to express itself in the way of
beauty and order ; and therefore we cannot but commend
the piety of Anatolius, and of Isidore, and Clemens, and
Origen, and others of eminent learning, who endeavoured to
bring about in this matter a uniformity of practice. " For
" what," asks the Emperor Constantine, in an epistle to
the churches, " can be more appropriate, or what more
" solemn, than that this feast, from which we have received
" the hope of immortality, should be invariably kept in one
" order, and for an obvious reason among all ? " Moved
by this noble sentiment, the same Emperor, after he had
convoked the Nicene Council for the suppression of the
Arian heresy, besought the assembled fathers to endeavour,
after weightier matters had been disposed of, to establish a
uniform rule in regard to the observance of this sacred feast.

The venerable fathers of Nice, in compliance with the
Emperor's request, took the matter into consideration, and
the result of their deliberation was that they censured the
Quartodeciman custom, declared that the feast ought to be
kept on Sunday, and strongly recommended the observance
of one rule, with the understanding that it should be left
to the Bishop of Alexandria to determine every year the
particular Sunday on which the feast was to be celebrated.
Further than this, as it seems to me, they did not go.
The " Paschal Canons," which are said by Mr. Wheatly
and others to have been then established, although they
correctly express the mind and usage in which the Catholic
Church finally concurred, are, I think, incorrectly ascribed
to the Nicene Council. No such canons are found in the
proceedings of the Council ; nor, on the supposition that

such canons were enacted, is it easy to account for the wide
discrepancies that existed on the subject for the next two
centuries between the churches of the East and the West.
The truth seems to be that the Alexandrian Bishops con-
tinued after the Council of Nice, as they had done before,
to use the Metonic Cycle, while the Bishops of Rome ad-
hered to the old Jewish Cycle of eighty-four years, the
defects of which led to the proposal of various other cycles
in the West, until at length all were drawn by common
consent to acknowledge the superiority of the Egyptian
method. There can be no doubt, however, that the ulti-
mate sense and usage of the Church are, as has been said,
correctly stated in the " Paschal Canons " which are thus
given by Wheatly :

" 1. That the 21st day of March shall be accounted the
" vernal equinox.

" 2. That the full moon happening upon or next after
" the 21st day of March, shall be taken for the full moon
" of Nisan.

" 3. That the Lord's day next following that full moon
" be Easter day.

" 4. But if the full moon happen upon a Sunday, Easter-
" day shall be the Sunday after."

In explanation of the second canon, it may be well to
remark that in consequence of the system of intercalation
adopted by the Jews, the 1st of Nisan might fall within
fifteen days before or fifteen days after the vernal equinox.
(*See Preface to First Part of Prideaux's Connex., p. xi,
fol. ed.*)

After the Council of Nice, the Bishop of Alexandria,
having ascertained the day of the year on which Easter
would fall, used to give notice of it to the Bishop of Rome,
who caused it by his deacons to be published in his patri-

archal church, on the Epiphany preceding, and then noti-
fied it by letters to all the metropolitans throughout the
Christian Church, who, in turn, extended the notice to
their suffragans. This provision was a great step towards
the uniformity which all desired to attain.

"And yet after this it was," says Bingham, "that Cyril
"still complained of great confusion in the account of
"Easter in the Church, in the camp, and in the palace ;
"and that the Roman and Alexandrian accounts some-
"times varied a week or a month from each other, as we
"have seen before, which was owing purely to their differ-
"ent ways of calculation ; because the Roman Church still
"proceeded by the old Jewish Cycle of eighty-four, and not
"by the new Alexandrian Cycle of nineteen. To remedy
"this confusion, one Victorius, a Frenchman, was employed
"by Hilarius, Archdeacon of Rome, to make a new paschal
"canon ; but neither did his attempt succeed ; for though
"he took in the Alexandrian Cycle of nineteen, yet still he
"retained so much of the Roman as made the variation of
"Easter Sunday sometimes a week and sometimes a month
"between them. And no effectual cure was found for this,
"till Dionysius Exiguus, A. D. 525, brought the Alexan-
"drian Canon entire into the use of the Roman Church."

The "Alexandrian Canon," in the use of which the
Catholic Church finally acquiesced with entire unanimity,
was founded on the Lunar Cycle of Meto (reduced from
6940 days to 6939 days 18 hours), and the Egyptian
Christians, in adapting it to the observance of Easter, may
be said to have been themselves the first "to spoil the
"Egyptians." *

---

* A customary phrase among the Fathers to justify the appropriation
of the arts, science and literature of the Heathen to the use of the Chris-
tian Church.

Having been drawn off with difficulty from the use of the Jewish Cycle, the Roman Church, as may be naturally supposed, was not a little hampered by its own precedents in the efforts which it afterwards made to recall the British Christians from the same use. It is curious, indeed, to observe the pious dexterity with which she retraced her steps, assumed the new way with the same confidence with which she had insisted on the old, and even forced it upon her followers with the same assertion of infallible authority founded on the tradition of St. Peter. That eminent chronologer and antiquary, Bishop Lloyd, in his " Account of " Church Government as it was in Great Britain and Ire- "land when they first received the Christian Religion," gives us a graphic description of the disputes of the Roman See on this subject with the British and Irish Churches.

Having shown that Christianity was in a flourishing state in Britain long before it was established at Rome under Constantine ; that the South Picts and the Irish were converted from idolatry to the Christian faith, the former by St. Nennianus, and the latter by St. Patrick, both Britons, in the early part of the fifth century, and that the North Picts were, in like manner, converted from Heathenism about the year 560 by St. Columba of the Irish Church, the author takes occasion to say that during the hundred years and more that intervened between the conversion of the Irish and that of the North Picts, there was almost no possibility of communication between Rome and the Britons in consequence of Italy being overrun by the barbarous nations. In this interval of time, he remarks, the Roman Church was so much altered from what it was formerly, that it was scarce to be known by them that had not seen it in many years ; it had grown very much in stature, and had, as it were, another countenance in the

outward face of its communion. Hence when, some time after, " Pope Gregory the First would make Austin the " Monk their Archbishop, these British Christians, contin- " uing in their primitive liberty, told him plainly, ' We " ' will not be thy subjects ; ' they knew of no authority he " had over them." The author then proceeds as follows :

" In like manner, within that interval of time, there were many things changed in the Roman Communion, which, after they had continued an age or two in their Church, themselves did not know, or would not own, to be altera- tions. This appeared especially in the rule that they had for the finding out of Easter, and of all their other movea- ble feasts. They found it by a cycle of eighty-four years, which was called the *Roman Account*, so lately as in Pope *Leo's* time. The Scots and South Picts used the same cycle from the time of their conversion ; and so did the Britons, without any manner of alteration. But about eighty years after the renting of the Roman Empire, the Romans, having left off the use of that cycle, took up an- other of nineteen years ; which, though it was better in many respects, yet was new in these parts, and made a great difference from the former. And when the Romans had used this new cycle another eighty years, coming then to have to do with these Northern Nations, they would needs have imposed the use of it upon them, as a condition of their Communion. They did, indeed, face them down with two things which were palpably false : one was that the Romans had received their cycle by tradition from St. Peter ; the other, that it was made use of everywhere, except in these islands. To the first of these assertions, the *Scots*, for want of knowing better, opposed only the authority of St. John for their cycle ; as to the other, they could not tell what to say ; whereas, in truth, though they did not know it, the *Roman* Account came but an age or two before from Alexandria, and was not yet received in all the Western Church, not in some part of France in par- ticular ; but that in use among the Scots was the same cycle that they and the Britons had ever used since their conversion, and it was the same that was anciently used in the *Roman* Church.

" By these instances, it sufficiently appears that though Rome had not yet proceeded so far as to make new Articles of Faith (for that was not done by any act of the Church,

that we read of, in a thousand years after Christ's time),
yet she had made great alterations in other things, and
made bold to impose them on other churches as conditions
of her Communion. It appears that these Northern
Churches were shut out of her Communion; they were
called the *Schismaticks of Britain* and *Ireland;* for no
other reason, but only because they would not receive these
alterations, nor submit to the authority by which they
were imposed. They, on the other hand, were not willing
to break Communion, but continued it with them that kept
Easter with the *Romans*, as some did without abetting
their usurpation. Thus the *British* Bishops joined in the
office of Ordination with *Wini*, a *Saxon*, that was made
Bishop in France. Thus the Scots helpt Birinus to con-
vert the West *Saxons*, though he had been made Bishop in
Italy. Nay, they join'd in Communion with them of *Kent*,
that had been converted immediately from Rome; and
never broke with them till they were forced to it, as I shall
shew in due place. Wheresoever they found the *Roman*
tyranny abetted against them, there, indeed, they stood
upon their terms, and laid the schism upon them that
were the cause of it, and would *no more communicate with
them than with Pagans*, as *Bede* tells us. The Scots of
South Ireland stood thus little more than thirty years after
Austin came over. All the other *Scots* and the *Picts* held
out near a hundred years longer. But the Britons much
above two hundred years. And yet the churches that stood
at this distance from *Rome*, all the while continued com-
munion with each other, and kept their religion the same in
all points that it was when the Roman Empire stood, and
the same that was anciently in the purer Roman Church."

It would be foreign to the design of the present treatise
to dwell further on the independence of the ancient British
Church, of which the Easter controversy is but one proof
among many. The subject is treated with his usual prod-
igality of learning by Stillingfleet—Ecclesiæ Anglicanæ
defensor semper invictus—in his Origines Britannicæ, " by
" far the best work," says Mr. Thackeray, " which has
" appeared on the subject." *   The theological student

* Preface to " Researches into the Ecclesiastical and Political State
" of Ancient Britain under the Roman Emperors," by the Rev. Francis
Thackeray.   London: 1843.

6

will do well to consult the fourth chapter of Bishop Stillingfleet's work, and particularly the concluding part of it (pp. 215-232), which relates to the Public Service of the British Churches, their difference from the Roman Offices, and the conformity of the Liturgy of the Reformed English Church to the ancient British Offices ; a conformity, it may be said in passing, which is more strikingly exemplified in the American than in the English Liturgy.

CHAPTER IX.

Correspondence of St. Leo and Proterius—Rival schemes for finding Easter forever—The Victorian Period or Paschal Cycle—The Dionysian Canon—Limits of the Paschal Week—The Calendar according to the Old Style completed—Reprint of the same, with directions for using it.

AMONG the letters of St. Leo, who was chosen Bishop of Rome A. D. 440, is one to the Emperor Marcian concerning the day on which Easter should be kept in the year 455. Having adverted to the fact that the Council of Nice had made it the duty of the Bishop of Alexandria to find out the Feast of Easter every year and make it known to the Roman See, that thence notice might be given to distant churches, St. Leo adds that Theophilus had made a Calendar for an hundred years, beginning at the year 380, but that the Easter for the seventy-sixth year of this Calendar, i. e., for the year 455, fell upon an extraordinary day, too much advanced in the month of April; and he therefore beseeches Marcian to recommend that an exact calculation be made in order that all churches may this year celebrate this feast at the same time. In another letter, St. Leo thanks the Emperor Marcian for having sent a person to Alexandria, that he might inform himself exactly of the time when Easter was to be celebrated. In yet another letter to the same Emperor, he thanks him for the inquiry he had made concerning the time of keeping Easter, tells him that he had received the letters of Proterius, the then Bishop of Alexandria, and that for the sake of peace and unity he would follow his judgment, though he is not

persuaded of his being in the right. And St. Leo was as good as his word ; for among his letters is a circular to the Bishops of Gaul and Spain, under date of July 28th, 454, in which, waiving his own judgment in the matter, he gives them notice " That the Feast of Easter in the next year " should be kept on the 22d of April ; the day determined " on by the Bishop of Alexandria." Not having access to the full correspondence, I cannot say what day St. Leo had fixed on for Easter day 455 ; but as the objection was that Easter day, according to the calculation of Proterius, was " too far advanced in April," and as the Roman Calendar (O. S.) makes Easter A. D. 455 fall on the 24th of April, it would seem that the rule of St. Leo is not sanctioned by Pius the Ninth, though doubtless his charity is approved.

The letter of Proterius, who was at that time the Bishop of Alexandria, on the Easter of 455, is preserved in the correspondence of St. Leo. In this he professes himself of a contrary judgment to St. Leo, and enters into a long and abstruse discussion to convince his Holiness that the 22d of April of that year is the day on which Easter ought to be kept. One is amused to find the learned Grecian, in conclusion, cautioning his Roman brother, " That he should " not venture to have this letter turned into Latin, because " it is very hard for men that do not understand the matter " well to express exactly so perplexed and intricate a debate " in Latin." *

Notwithstanding the wholesome direction of the Council of Nice that the calculation of Easter should be referred every year to the Bishop of Alexandria, various cycles sprang up, prompted not so much by an impatience of control as by the desire of a more expeditious method, and

---

* See a synopsis of the correspondence in Du Pin, vol. iii, part ii (century 5th), pp. 99–101.

one which should determine the time of the feast for some years in advance. The historian Eusebius led the way; Theophilus, patriarch of Alexandria, drew up a table for the Emperor Theodosius, determining Easter for a hundred years to come; and Cyril, his nephew and successor, invented a period of five lunar cycles, or ninety-five years, which was much commended. These are now rather valuable as showing the genius of the age than as throwing light on the final adjustment of the Calendar. To clear this matter, it is only necessary to direct attention to two points—1. The Victorian period; and 2. What is commonly called the Dionysian Canon.

1. The Victorian period, better known as the Paschal Cycle, is the combined product of the number of years (28) of the Solar Cycle, and the number of years (19) of the Lunar Cycle, and is consequently equal to five hundred and thirty-two years. It is called the Victorian Period, from its author Victorius, a native of Aquitaine, and an eminent mathematician. It is called the Paschal Period, because, combining the phenomena of the Solar and Lunar Cycles, it exhibits them in harmony, and enables us, by setting the days of the moon parallel to the days of the solar week, to find Easter day forever. For at the end of every five hundred and thirty-two years, assuming the correctness of the Cycle, the days of the moon must fall on the same days as at the beginning; and knowing the day of the week on which the Paschal Moon is full, the Dominical Letter for the year directs us to Easter day. This discovery was all that was wanting to make the Calendar perpetual; and it soon led the way to the practice which has ever since been followed of inserting two columns in the Calendar parallel with the days of the month; the one (which, indeed, had been in use before) affixing to the several days of the week their

proper letters, each of which becomes in its turn a Dominical Letter; and the other enabling us to ascertain the age of the moon on each day of the solar month.

2. But the Easter problem was not yet solved, nor was the complete solution of it achieved by Victorius. For, as Bingham says, there was among those that used the Victorian Period, a variation, sometimes of a week and sometimes of a month, in the time of observing Easter; nor was the desired uniformity established until the adoption of what is commonly called "The Dionysian Canon," but which is really nothing more than the old Alexandrian Canon respecting the limits of the Easter week; the different usages in regard to which I now go to explain.

The law of Moses enjoined that the Passover should be slain on the 14th of the Lunar Month Abib, and that the day on which the Passover was slain should be the beginning of a holy week. For in the Book of Exodus, immediately after the institution of the Passover, it is added, " Seven days shall ye eat unleavened bread.   *   *   *   In " the first day there shall be an holy convocation to you." Now the seven days of unleavened bread were counted from the day of the full moon (on whatever day of the civil week that chanced to be), and formed, of course, the third week of the lunar month. Easter, as was confessed by all Christians after the decay of the Quartodeciman party above mentioned, fell on the Sunday of this week, which might be any day of the lunar week from the first to the seventh; so that the Christian Feast of seven days, which we call Easter week, always began in the third week of the moon on Sunday. So far there seems, after the Council of Nice, to have been no difference of opinion; all agreeing that Easter Sunday was the Sunday after the full moon; in other words, the Sunday which fell in the third week of

the moon. But as to the *limits* of this week, there was no
such agreement; on the contrary, there were three several
theories, each of which had numerous patrons and follow-
ers; these made the week extend—the first from the 16th
to the 22d, both inclusive; the second from the 14th to the
20th, both inclusive; the third from the 15th to the 21st,
both inclusive; and hence it happened that there was occa-
sionally a difference of a week or even a month in their
celebrations; and as the Paschal month was the beginning
of a year, the mistake might have the effect of throwing
two Easters into one year.

The oldest rule was, I believe, that of those who made
the 16th and 22d the limits of the third week, and who
consequently never celebrated Easter before the 16th of the
moon. The Roman Church at first and for a long time
adhered to this rule in connexion with its cycle of eighty-
four years; and the reason given for the rule was that
Good Friday, or the anniversary of the Crucifixion, might
never fall before the 14th of the moon when the typical
Passover was offered, as it might have fallen had they
celebrated Easter on the 15th. They who made the 14th
and 20th the limits of the week seem to have adhered to
the letter of the law (Ex. xii, 17) without well considering
its meaning. The British and the old Irish (afterwards
called the Scottish) Church clung to this rule with great
tenacity, not entirely surrendering it until the ninth cen-
tury, and for their adhesion to it were sometimes called
Quartodecimans; not because (as some of the learned have
erroneously supposed) they kept their Easter on the 14th
day of the Moon—for that usage had been effectually ex-
ploded by the Council of Nice—but because they made the
14th of the Moon one of the limits of the week in which
Easter fell. The third rule, and that which ultimately

prevailed, was to regard the week as extending from the 15th of the Moon to the 21st, both inclusive, and to begin the Easter festival on the Sunday of that week. And this rule has the best support from Scripture ; for although the 14th of Nisan is said to be the day on which the Passover was slain, yet it will be found, on careful examination, that the 14th was rather a day of preparation, and that the Passover was slain on the evening following the 14th, that is, properly speaking, on the evening or beginning of the 15th. Moreover, the feast of unleavened bread is said to begin on that *self-same day* on which God brought the Israelites out of Egypt, and this day, as may be inferred from the account in Exodus, is elsewhere (Num. xxxiii, 3d) expressly said to be the 15th of the Moon.

This is the rule which was followed by the Bishops of Alexandria, who, reckoning Easter day to be the Sunday which fell between the 15th and 21st of the Moon, besides having the better cycle, had the further advantage of a correct rule for its application. The Roman Church, on the other hand, erred in both respects ; first, by adhering to the old Jewish Cycle ; and secondly, after it was brought off from that by Victorius A. D. 457, by assigning wrong limits to the Paschal week ; nor was it until A. D. 527 that, under the lead of the little Scythian, Dionysius Exiguus, as he is generally called, it was cured of this error, and taught what it now teaches to be the true way of finding Easter. The Romans, indeed, contended stoutly both for their cycle and their rule of applying it, but they were at length obliged to yield, first the one point and then the other, to their more skilful brethren of Alexandria.

The knowledge of these different usages in regard to the bounds of the Paschal week is necessary to a correct understanding of the disputes which prevailed during the sixth,

seventh and eighth centuries, between the Roman Church on the one hand, and the Gallic and British Churches on the other. During these centuries the Romans, following Dionysius, reckoned the Paschal week from the 15th day of the Moon to the 21st, both inclusive ; the Gauls, following Victorius, reckoned from the 16th to the 22d, and the Britons, following Sulpicius Severus, reckoned from the 14th to the 20th of the Moon, all inclusive.

The experience of more than a thousand years has verified the anticipation of the author of the Paschal Cycle ; viz., that it shows the day (be it what day it will) to be the same day of the year, month, moon, and week that it was five hundred and thirty-two years ago, and will be five hundred and thirty-two years hence ; and has taught the Church so to amend the Calendar founded on this period that we may now designate the day on which Easter will fall five thousand years hence with the same certainty that we may name to-day the hour at which the sun will rise to-morrow.

Having thus traced, as clearly as I could, the origin of the Church Calendar, I shall now give the Calendar to the readers as it stood in our English Prayer Books before 1752, when it was revised and made to conform to the New or Gregorian Style as nearly as the House of Hanover permitted, or the temper of the English people at the time rendered expedient. It is the same as the traditionary Calendar set forth in the first Prayer Book of Edward VI and in subsequent Revisions, and is doubtless one of the links which bind us to the Church of the Venerable Bede. Of course I am speaking of the Calendar proper, and not of the Saints' Days, Lessons, and other accessories.

The reader is requested to take notice that according to the Old Style of the Calendar Easter day is found by

means of the *Golden Numbers ;* and not by the system of epacts which is proper to the New Style, nor by the fusion of the two which distinguishes the English and American Prayer Books.

The Golden Numbers, for the origin of which see pages 67–69, are the numbers from 1 to 19, both inclusive, which denote the years of the *Metonic* Cycle ; which, having superseded all other cycles for the adjustment of the lunar and solar time, has come to be called, by way of eminence, The *Lunar* Cycle. To find the Golden Number for a given year of any era is merely to find how many times the Lunar Cycle has revolved since the beginning of that era. The Christian era began one year after the commencement of one of these cycles ; and for this reason it is that the rule to find the Golden Number for a year of the Christian era directs us to add one to the given year before dividing by 19, the number of years in the Cycle. The quotient, when the division is made, shows the number of cycles that have revolved since the beginning of the Christian era ; the remainder, if there be one, is the Golden Number for the given year ; or, if there be no remainder, 19 is the Golden Number.

In our Church Calendar, the Golden Numbers are also called the *Primes ;* probably because they serve to indicate the *prime ;* a word which was formerly used to signify the *new moon*, but which in this sense is now obsolete.

The Golden Numbers or Primes are contained in the first column of the Calendar. They are not all, it will be observed, used in any one month ; neither are they placed in numerical order ; but only so many of them are used in the Calendar for any one month as are needed to show the new moons which, in the course of the nineteen years of the Cycle, fall in that month. The order in which they are

put has reference to the day of the new moon : III, for example, being set opposite to the first day of March because in every third year of the Cycle the new moon falls on the first day of March, and XI being set opposite to the third day of March because in every eleventh year of the Cycle there is a new moon on the third day of March. So throughout, *the Golden Number for the year is set in every month opposite to the day of the new moon which happens in that month.*

To find Easter for a given year according to the Old Style, enter the Calendar at the eighth day of March, and run your eye down till you come to the Golden Number for the year, opposite to which is the day of the Paschal new moon, the fourteenth day from which (both inclusive) is the day of the Paschal full moon ; and the next following day, which has opposite to it the Dominical Letter (Old Style) for the year, is Easter day; or if the day of the full moon be Sunday, then Easter day is the Sunday after.

Required Easter day for 1470, the Golden Number being VIII, and G the Dominical Letter. Opposite to April 5th is the Golden Number VIII, and the 14th day from April 5th is April 18th, and G is next found opposite to April 22d ; which was Easter day in 1470.

The Kalendar.

— ·~~⚜~~· —

JANUARY HATH XXXI DAYS.

THE MOON HATH XXX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer.		EVENING Prayer.	
					1 Lesson.	2 Lesson.	1 Lesson.	2 Lesson.
*2	1	*A*	Kalend......	Circumcision of our Lord.				
	2	*b*	4 No.		Gen. 1	Matt. 1	Gen. 2	Rom. 1
10	3	*c*	3 No.		3	2	4	2
	4	*d*	Pr. No.		5	3	6	3
19	5	*e*	Nonæ.		7	4	8	4
8	6	*f*	8 Id.	Epiphany of our Lord.				
	7	*g*	7 Id.		9	5	12	5
16	8	*A*	6 Id.	Lucian, Priest and Martyr....	13	6	14	6
5	9	*b*	5 Id.		15	7	16	7
	10	*c*	4 Id.		17	8	18	8
13	11	*d*	3 Id.		19	9	20	9
2	12	*e*	Pr. Id.		21	10	22	10
	13	*f*	Idus	Hilary, Bishop, and Confes...	23	11	24	11
*10	14	*g*	19 Kl. Febr.		25	12	26	12
	15	*A*	18 Kl.		27	13	28	13
18	16	*b*	17 Kl.		29	14	30	14
7	17	*c*	16 Kl.		31	15	32	15
	18	*d*	15 Kl.......	Prisca, Rom. Virg. and Mart.	33	16	34	16
15	19	*e*	14 Kl.		35	17	37	1 Cor. 1
4	20	*f*	13 Kl.......	Fabian, B. of Rome, and M ..	38	18	39	2
	21	*g*	12 Kl.......	Agnes, Rom. Virg. and Mart.	40	19	41	3
12	22	*A*	11 Kl.......	Vincent, Span. Deac. and M..	42	20	43	4
1	23	*b*	10 Kl.		44	21	45	5
	24	*c*	9 Kl.		46	22	47	6
9	25	*d*	8 Kl.......	Conversion of S. Paul.				
	26	*e*	7 Kl.		48	23	49	7
17	27	*f*	6 Kl.		50	24	Exod. 1	8
6	28	*g*	5 Kl.		Exod. 2	25	3	9
	29	*A*	4 Kl.		4	26	5	10
*13	30	*b*	3 Kl.......	K. Charles Martyr	†6	27	7	11
3	31	*c*	Prid. Kl.		8	28	9	12

[* The figures to which the asterisk is affixed are known to be erroneous, but as they were found in the Sealed Books editors did not feel at liberty to alter them, and consequently they were continued in all the old editions of the Prayer Book, and are so given in Keeling's Liturgiæ Britannicæ. For 2, however, read 3; for 10 read 11, and for 13 read 14. The same Golden Number never occurs twice in the same lunar month.]

† Note, that Exodus vi. is to be read only to verse 14.

The Kalendar.

FEBRUARY HATH XXVIII DAYS.

THE MOON HATH XXX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. accoroing to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer. 1 Lesson	2 Lesson	EVENING Prayer. 1 Lesson	2 Lesson
	1	d	Kalend......	Fast	Exod.10	Mark 1	Exod.11	1 Cor.13
11	2	e	4 No	Purif. of Mary the B. Virgin.....	....	2	....	14
19	3	f	3 No.		12	3	13	15
8	4	g	Pr. No.		14	4	15	16
	5	A	Non⁻	Agatha, Sicilian V. & M......	16	5	17	2 Cor. 1
16	6	b	8 Id.		18	6	19	2
5	7	c	7 Id.		20	7	21	3
	8	d	6 Id.		22	8	23	4
13	9	e	5 Id.		24	9	22	5
2	10	f	4 Id.		33	10	34	6
	11	g	3 Id.		Levit.18	11	Levit.19	7
10	12	A	Pr. Id.		20	12	26	8
	13	b	Idus.		Num. 11	13	Num. 12	9
18	14	c	16 Kl. Mart.	Valentine, Bish. & Martyr....	13	14	14	10
7	15	d	15 Kl.		16	15	17	11
	16	e	14 Kl.		20	16	21	12
15	17	f	13 Kl.		22	L.i.to 39	23	13
4	18	g	12 Kl.		24	i., 39	25	Galat. 1
	19	A	11 Kl.		27	2	30	2
12	20	b	10 Kl.		31	3	32	3
1	21	c	9 Kl.		35	4	36	4
	22	d	8 Kl.		Deut. 1	5	Deut. 2	5
9	23	e	7 Kl	Fast	3	6	4	6
	24	f	6 Kl	S. Matthias, Apost. & Mart	....	7	....	Ephes.1
17	25	g	5 Kl.		5	8	6	2
6	26	A	4 Kl.		7	9	8	3
	27	b	3 Kl.		9	10	10	4
14	28	c	Pr. Kl.		11	11	12	5
	29					13	Matth. 7	14 Rom. 12

[The headings to the several columns, except those for Morning and Evening Prayer, and also the notes in brackets, have been supplied by the present editor.]

The Kalendar.

MARCH HATH XXXI DAYS.

THE MOON HATH XXX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer.		EVENING Prayer.	
					1 Lesson.	2 Lesson.	1 Lesson.	2 Lesson.
3	1	d	Ka'end.	David, Archb. of Menevia.	Deut. 15	Luke 12	Deut. 16	Ephes.6
	2	e	6 No.	Cedde or Chad., B. of Litch.	17	13	18	Philip.1
11	3	f	5 No.		19	14	20	2
	4	g	4 No.		21	15	22	3
19	5	A	3 No.		24	16	25	4
8	6	b	Pr. No.		26	17	27	Colos. 1
	7	c	Nonæ.	Perpetua, Mauritan. Martyr.	28	18	29	2
16	8	d	8 Id.		30	19	31	3
5	9	e	7 Id.		32	20	33	4
	10	f	6 Id.		34	21	Josh. 1	1 Thes.1
13	11	g	5 Id.		Josh. 2	22	3	2
2	12	A	4 Id.	Greg. M. B. of Rome, & C.	4	23	5	3
	13	b	3 Id.		6	24	7	4
10	14	c	Pr. Id.		8	John 1	9	5
	15	d	Idus:		10	2	23	2 Thes.1
18	16	e	17 Kl. Apr.		24	3	Judg. 1	2
7	17	f	16 Kl.		Judg. 2	4	3	3
	18	g	15 Kl.	Edw. K. of the West Sax.	4	5	5	1 Tim. 1
15	19	A	14 Kl.		6	6	7	2, 3
4	20	b	13 Kl.		8	7	9	4
	21	c	12 Kl.	Benedict, Abbot.	10	8	11	5
12	22	d	11 Kl.		12	9	13	6
1	23	e	10 Kl.		14	10	15	2 Tim. 1
	24	f	9 Kl.	Fast.	16	11	17	2
9	25	g	8 Kl.	Annunciation of Mary.	. . . . .	12	. . . . . .	3
	26	A	7 Kl.		18	13	19	4
17	27	b	6 Kl.		20	14	21	Titus 1
6	28	c	5 Kl.		Ruth 1	15	Ruth 2	2, 3
	29	d	4 Kl.		3	16	4	Philem.
14	30	e	3 Kl.		1 Sam. 1	17	1 Sam. 2	Heb. 1
3	31	f	Pr. Kl.		3	18	4	2

The Kalendar.

APRIL HATH XXX DAYS.

THE MOON HATH XXIX.

Golden Nos.	Days of month.	Days of week.	Days of the no. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer.		EVENING Prayer.	
					1 Lesson.	2 Lesson.	1 Lesson.	2 Lesson.
	1	g	Kalend.		1 Sam. 5	John 19	1 Sam. 6	Hebr. 3
11	2	A	4 No.		7	20	8	4
3	3	b	3 No.	Richard, B. of Chichester.	9	21	10	5
19	4	c	Pr. No.	S. Ambrose, Bish. of Milan.	11	Acts 1	12	6
8	5	d	Nonæ.		13	2	14	7
16	6	e	8 Id.		15	3	16	8
5	7	f	7 Id.		17	4	18	9
	8	g	6 Id.		19	5	20	10
13	9	A	5 Id.		21	6	22	11
2	10	b	4 Id.		23	7	24	12
	11	c	3 Id.		25	8	26	13
10	12	d	Pr. Id.		27	9	28	James 1
	13	e	Idus		29	10	30	2
18	14	f	18 Kl. May.		31	11	2 Sam. 1	3
7	15	g	17 Kl.		2 Sam. 2	12	3	4
	16	A	16 Kl.		4	13	5	5
15	17	b	15 Kl.		6	14	7	1 Pet. 1
4	18	c	14 Kl.		8	15	9	2
	19	d	13 Kl.	Alphege, Archb. of Cant.	10	16	11	3
12	20	e	12 Kl.		12	17	13	4
1	21	f	11 Kl.		14	18	15	5
	22	g	10 Kl.		16	19	17	2 Pet. 1
9	23	A	9 Kl.	S. George, Martyr.	18	20	19	2
	24	b	8 Kl.		20	21	21	3
17	25	c	7 Kl.	S. Mark, Evang. & Martyr.	....	22	....	1 John 1
6	26	d	6 Kl.		22	23	23	2
	27	e	5 Kl.		24	24	1 King 1	3
14	28	f	4 Kl.		1 King 2	25	3	4
3	29	g	3 Kl.		4	26	5	5
	30	A	Pr. Kl.		6	27	7	2, 3 Joh.

The Kalendar.

~~~

MAY HATH XXXI DAYS.

THE MOON HATH XXX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer. 1 Lesson.	2 Lesson.	EVENING Prayer. 1 Lesson.	2 Lesson.
2	1	b	Kalend.	S. Philip & S. Jacob, Apost, &	....	....	....	Jude.
	2	c	6 No.	[Mart.	i.King 8	Acts 28	i.King 9	Rom. 1
19	3	d	5 No.	Invention of the Cross.	10	Matth. 1	11	2
8	4	e	4 No.		12	2	13	3
1	5	f	3 No.		14	3	15	4
16	6	g	Pr. No.	S. John, Evang. ante Port Lat.	16	4	17	5
5	7	A	None.		18	5	19	6
	8	b	8 Id.		20	6	21	7
13	9	c	7 Id.		22	7	2 King 1	8
2	10	d	6 Id.		2 King 2	8	3	9
	11	e	5 Id.		4	9	5	10
10	12	f	4 Id.		6	10	7	11
	13	g	3 Id.		8	11	9	12
18	14	A	Pr. Id.		10	12	11	13
7	15	b	Idus.		12	13	13	14
	16	c	17 Kl. Junii.		14	14	15	15
15	17	d	16 Kl.		16	15	17	16
4	18	e	15 Kl.		18	16	19	1 Cor. 1
	19	f	14 Kl.	Dunstan, Archb. of Cant.	20	17	21	2
12	20	g	13 Kl.		22	18	23	3
1	21	A	12 Kl.		24	19	25	4
	22	b	11 Kl.		Ezra 1	20	Ezra 3	5
9	23	c	10 Kl.		4	21	5	6
	24	d	9 Kl.		6	22	7	7
17	25	e	8 Kl.		9	23	Neh. 1	8
6	26	f	7 Kl.	August. first Archb. of Cant.	Neh. 2	24	4	9
	27	g	6 Kl.	Ven. Bede, Presbyter.	5	25	6	10
14	28	A	5 Kl.		8	26	9	11.
3	29	b	4 Kl.	Charles ii., Nat. & Ret.	10	27	13	12
	30	c	3 Kl.		Esther 1	28	Esther 2	13
11	31	d	Pr. Kl.		3	Mark 1	4	14

The Kalendar.

JUNE HATH XXX DAYS.

THE MOON HATH XXIX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS	MORNING Prayer.		EVENING Prayer.	
					1 Lesson.	2 Lesson.	1 Lesson.	2 Lesson.
	1	*e*	Kalend.	Nicomede, Rom. Pr. & M.	Esther 5	Mark 2	Esther 6	1 Cor. 15
19	2	*f*	4 No.		7	3	8	16
8	3	*g*	3 No.		9	4	Job 1	2 Cor. 1
16	4	*A*	Pr. No.		Job 2	5	3	2
5	5	*b*	Nonæ.	Boniface, B. of Mentz & M.	4	6	5	3
	6	*c*	8 Id.		6	7	7	4
13	7	*d*	7 Id.		8	8	9	5
2	8	*e*	6 Id.		10	9	11	6
	9	*f*	5 Id.		12	10	13	7
10	10	*g*	4 Id.		14	11	15	8
	11	*A*	3 Id.	S. Barnabas, Apost. & M.	16	12	17, 18	9
18	12	*b*	Pr. Id.		19	13	20	10
7	13	*c*	Idus.		21	14	22	11
	14	*d*	18 Kl. Julif.		23	15	24, 25	12
15	15	*e*	17 Kl.		26, 27	16	28	13
4	16	*f*	16 Kl.			29 Luke 1	30	Galat. 1
	17	*g*	15 Kl.	S. Alban, Martyr.	31	2	32	2
12	18	*A*	14 Kl.	[West-Sax.	33	3	34	3
1	19	*b*	13 Kl.	Transl. of Edward, K. of the	35	4	36	4
	20	*c*	12 Kl.		37	5	38	5
9	21	*d*	11 Kl.		39	6	40	6
	22	*e*	10 Kl.	Fast.	41	7	42	Ephes. 1
17	23	*f*	9 Kl.	Nativity of S. John, Baptist.				
6	24	*g*	8 Kl.		Prov. 1	8	Prov. 2	2
	25	*A*	7 Kl.		3	9	4	3
14	26	*b*	6 Kl.		5	10	6	4
3	27	*c*	5 Kl.	Fast.	7	11	8	5
	28	*d*	4 Kl.	S. Peter, Apostle & Martyr.				
11	29	*e*	3 Kl.		9	12	10	6
	30	*f*	Pr. Kl.					

7

The Kalendar.

JULY HATH XXXI DAYS.
THE MOON HATH XXX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer.		EVENING Prayer.	
					1 Lesson,	2 Lesson.	1 Lesson.	2 Lesson.
19	1	g	Kalend.		Prov. 11	Luke 13	Prov. 12	Philip.1
8	2	A	6 No.	Visitat. of the Bl. V. Mary.	13	14	14	2
	3	b	5 No.		15	15	16	3
16	4	c	4 No.	Trans. of S. Martin, B. & C.	17	16	18	4
5	5	d	3 No.		19	17	20	Colos. 1
	6	e	Pr. No.		21	18	22	2
13	7	f	Nonæ.		23	19	24	3
2	8	g	8 Id.		25	20	26	4
	9	A	7 Id.		27	21	28	1 Thes.1
10	10	b	6 Id.		29	22	31	2
	11	c	5 Id.		Eccl. 1	23	Eccl. 2	3
18	12	d	4 Id.		3	24	4	4
7	13	e	3 Id.		5	John 1	6	5
	14	f	Pr. Id.		7	2	8	2 Thes.1
15	15	g	Idus:	Swithun, B. Winch., Transl.	9	3	10	2
4	16	A	17 Kl. Aug.		11	4	12	3
	17	b	16 Kl.		Jerem.1	5	Jerem.2	1 Tim. 1
12	18	c	15 Kl.		3	6	4	2, 3
1	19	d	14 Kl.		5	7	6	4
	20	e	13 Kl.	Margaret, V. & M., Antioch.	7	8	8	5
9	21	f	12 Kl.	S. Mary Magdalen.	9	9	10	6
	22	g	11 Kl.		11	10	12	2 Tim. 1
17	23	A	10 Kl.		13	11	14	2
6	24	b	9 Kl.	Fast.	15	12	16	3
	25	c	8 Kl.	S. James, Apostle & Martyr.	....	13	....	4
13	26	d	7 Kl.	S. Anne, Mother to the Bl.	17	14	18	Titus 1
3	27	e	6 Kl.	[Vir. Mary.	19	15	20	2, 3
	28	f	5 Kl.		21	16	22	Philem.
11	29	g	4 Kl.		23	17	24	Heb. 1
	30	A	3 Kl.		25	18	26	2
19	31	b	Pr. Kl.		27	19	28	3

The Kalendar.

AUGUST HATH XXXI DAYS.

THE MOON HATH XXX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer.		EVENING Prayer.	
					1 Lesson.	2 Lesson.	1 Lesson.	2 Lesson.
8	1	c	Kalend.	Lammas day.	Jer. 29	John 20	Jer. 30	Hebr. 4
16	2	d	4 No.		31	21	32	5
5	3	e	3 No.		33	Acts 1	34	6
	4	f	Pr. No.		35	2	36	7
13	5	g	Nonæ.		37	3	38	8
2	6	A	8 Id.	Transfigur. of our Lord.	39	4	40	9
	7	b	7 Id.	Name of Jesus.	41	5	42	10
10	8	c	6 Id.		43	6	44	11
	9	d	5 Id.		45, 46	7	47	12
18	10	e	4 Id.		48	8	49	13
7	11	f	3 Id.		50	9	51	James 1
	12	g	Pr. Id.		52	10	Lam. 1	2
15	13	A	Idus		Lam. 2	11	3	3
4	14	b	19 Kl. Sept.		4	12	5	4
	15	c	18 Kl.		Ezek. 2	13	Ezek. 3	5
12	16	d	17 Kl.		6	14	7	1 Pet. 1
1	17	e	16 Kl.		13	15	14	2
	18	f	15 Kl.		18	16	33	3
9	19	g	14 Kl.		34	17	Dan. 1	4
	20	A	13 Kl.		Dan. 2	18	3	5
17	21	b	12 Kl.		4	19	5	2 Pet. 1
6	22	c	11 Kl.		6	20	7	2
	23	d	10 Kl.	Fast.	8	21	9	3
14	24	e	9 Kl.	S. Bartholomew, Ap. & M.	....	22	....	1 John 1
3	25	f	8 Kl.		10	23	11	2
	26	g	7 Kl.		12	24	Hosea 1	3
11	27	A	6 Kl.		Hos.2, 3	25	4	4
	28	b	5 Kl.	S. August, B. of Hippo. C. D.	5, 6	26	7	5
19	29	c	4 Kl.	Beheading of S. John Bapt.	8	27	9	2, 3 Joh.
8	30	d	3 Kl.		10	28	11	Jude.
	31	e	Pr. Kl.			12	Matth. 1	13 Rom. 1

The Kalendar.

SEPTEMBER HATH XXX DAYS.

THE MOON HATH XXIX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer.		EVENING Prayer.	
					1 Lesson.	2 Lesson.	1 Lesson.	2 Lesson.
16	1	f	Kalend.	Giles, Abbot & Confess.	Hos. 14	Matth. 2	Joel 1	Rom. 2
5	2	g	4 No.		Joel 2	3	3	3
	3	A	3 No.		Amos 1	4	Amos 2	4
13	4	b	Pr. No.		3	5	4	5
2	5	c	Nonæ.		5	6	6	6
	6	d	8 Id.		7	7	8	7
10	7	e	7 Id.	Enurchus, Bish. of Orleans.	9	8	Obad.	8
	8	f	6 Id.	Nativity of the B. V. Mary.	Jonah 1	9	Jon. 2, 3	9
18	9	g	5 Id.		4	10	Mich. 1	10
7	10	A	4 Id.		Mich. 2	11	3	11
	11	b	3 Id.		4	12	5	12
15	12	c	Pr. Id.		6	13	7	13
4	13	d	Idus.		Nah. 1	14	Nah. 2	14
	14	e	18 Kl. Oct.		3	15	Hab. 1	15
12	15	f	17 Kl.		Hab. 2	16	3	16
1	16	g	16 Kl.		Zeph. 1	17	Zeph. 2	1 Cor. 1
	17	A	15 Kl.	Lambert, Bish. and Mart.	3	18	Hagg. 1	2
9	18	b	14 Kl.		Hagg. 2	19	Zech. 1	3
	19	c	13 Kl.		Zec. 2, 3	20	4, 5	4
17	20	d	12 Kl.	Fast.	6	21	7	5
6	21	e	11 Kl.	S. Matthew, Ap., Evan. & M.	....	22	....	6
	22	f	10 Kl.		8	23	9	7
14	23	g	9 Kl.		10	24	11	8
3	24	A	8 Kl.		12	25	13	9
	25	b	7 Kl.	[& Mart.	14	26	Mal. 1	10
11	26	c	6 Kl.	S. Cyprian, Archb. of Carth.	Mal. 2	27	3	11
19	27	d	5 Kl.		4	28	Tob. 1	12
	28	e	4 Kl.		Tobit 2	Mark 1	3	13
8	29	f	3 Kl.	S. Michael, and all Angels.	....	2	....	14
	30	g	Pr. Kl.	S, Jerom, Pr. Conf. & Doct.	4	3	6	15

The Kalendar.

❦

OCTOBER HATH XXXI DAYS.

THE MOON HATH XXX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer.		EVENING Prayer.	
					1 Lesson.	2 Lesson.	1 Lesson.	2 Lesson.
16	1	*A*	Kalend.	Remigius, Bish. of Rhemes.	Tobit 7	Mark 4	Tobit 8	1 Cor.16
5	2	*b*	6 No.		9	5	10	2 Cor. 1
13	3	*c*	5 No.		11	6	12	2
2	4	*d*	4 No.		13	7	14	3
	5	*e*	3 No.		Judith 1	8	Judith 2	4
10	6	*f*	Pr. No.	Faith, Virgin and Martyr.	3	9	4	5
	7	*g*	Nonæ.		5	10	6	6
18	8	*A*	8 Id.		7	11	8	7
7	9	*b*	7 Id.	S. Denys, Areop. B. & M.	9	12	10	8
	10	*c*	6 Id.		11	13	12	9
15	11	*d*	5 Id.		13	14	14	10
4	12	*e*	4 Id.		15	15	16	11
	13	*f*	3 Id.	Trans. of K. Edward, Conf.	Wisd. 1	16	Wisd. 2	12
12	14	*g*	Pr. Id.		3	L.1 to 39	4	13
1	15	*A*	Idus.		5	1, 39	6	Galat. 1
	16	*b*	17 Kl. Nov.		7	2	8	2
9	17	*c*	16 Kl.	Etheldred, Virg.	9	3	10	3
	18	*d*	15 Kl.	S. Luke, Evangelist.	....	4	....	4
17	19	*e*	14 Kl.		11	5	12	5
6	20	*f*	13 Kl.		13	6	14	6
	21	*g*	12 Kl.		15	7	16	Ephes.1
14	22	*A*	11 Kl.		17	8	18	2
3	23	*b*	10 Kl.		19	9	Ecclus.1	3
	24	*c*	9 Kl.		Ecclus.2	10	3	4
11	25	*d*	8 Kl.	Crispin, Mart.	4	11	5	5
	26	*e*	7 Kl.		6	12	7	6
19	27	*f*	6 Kl.	Fast.	8	13	9	Phil. 1
8	28	*g*	5 Kl.	S. Simon & S. Jude, A. & M.	....	14	....	2
	29		4 Kl.		10	15	11	3
16	30	*b*	3 Kl.		12	16	13	4
5	31	*c*	Pr. Kl.	Fast.	14	17	15	Col. 1

The Kalendar.

❦

NOVEMBER HATH XXX DAYS.

THE MOON HATH XXIX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer.		EVENING Prayer.	
					1 Lesson.	2 Lesson.	1 Lesson.	2 Lesson.
	1	d	Kaland.	All Saints day.				
13	2	e	4 No.		Ecclu.16	Luke 18	Ecclu.17	Colos. 2
2	3	f	3 No.		18	19	19	3
	4	g	Pr. No.		20	20	21	4
10	5	A	Nonæ.	Papists' Conspiracy.	22	21	23	1 Thes.1
	6	b	8 Id.	Leonard, Confessor.	24	22	(a) 25	2
18	7	c	7 Id.		27	23	28	3
7	8	d	6 Id.		29	24	(b) 30	4
	9	e	5 Id.			31	John 1	32	5
15	10	f	4 Id.		33	2	34	2 Thes.1
4	11	g	3 Id.	S. Martin, Bish. and Confess.	35	3	36	2
	12	A	Pr. Id.		37	4	38	3
12	13	b	Idus.	Britius, Bishop.	39	5	40	1 Tim. 1
1	14	c	18 Kl. Dec.		41	6	42	2, 3
	15	d	17 Kl.	Machutus, Bishop.	43	7	44	4
9	16	e	16 Kl.		45	8	(c) 46	5
	17	f	15 Kl.	Hugh, Bishop of Lincoln.	47	9	48	6
17	18	g	14 Kl.		49	10	50	2 Tim. 1
6	19	A	13 Kl.		51	11	Baruc. 1	2
	20	b	12 Kl.	Edmund, King and Martyr.	Baruc. 2	12	3	3
14	21	c	11 Kl.		4	13	5	4
3	22	d	10 Kl.	Cecilia, Virgin and Martyr.	6	14	H.of Su.	Titus 1
	23	e	9 Kl.	S. Clement I., B. of R. & M. ⎰	Bell and the Dr. ⎱		15 Isaiah 1	2, 3
11	24	f	8 Kl.		Isaiah 2	16	3	Philem.
19	25	g	7 Kl.	Catherine, Virgin and Mart.	4	17	5	Heb. 1
	26	A	6 Kl.		6	18	7	2
8	27	b	5 Kl.		8	19	9	3
	28	c	4 Kl.		10	20	11	4
16	29	d	3 Kl.	Fast.	12	21	13	5
5	30	e	Pr. Kl.	S. Andrew, Apostle & Mart.	....	Acts 1	....	6

NOTE, that (a) Ecclus. 25 is to be read only to verse 13, and (b) Ecclus. 30 only to verse 13, and (c) Ecclus. 46 only to verse 20.

𝕿𝖍𝖊 𝕶𝖆𝖑𝖊𝖓𝖉𝖆𝖗.

DECEMBER HATH XXXI DAYS.

THE MOON HATH XXX.

Golden Nos.	Days of month.	Days of week.	Days of the mo. according to the Roman computation.	FESTIVALS AND OTHER HOLY DAYS.	MORNING Prayer. 1 Lesson.	MORNING Prayer. 2 Lesson.	EVENING Prayer. 1 Lesson.	EVENING Prayer. 2 Lesson.
	1	*f*	Kalend.		Isai. 14	Acts 2	Isai. 15	Hebr. 7
13	2	*g*	4 No.		16	3	17	8
2	3	*A*	3 No.		18	4	19	9
10	4	*b*	Pr. No.		20, 21	5	22	10
	5	*c*	Nonæ.		23	6	24	11
18	6	*d*	8 Id.	Nicolas, B. of Myra in Lycia.	25	7 to v.30	26	12
7	7	*e*	7 Id.		27	7, 30	28	13
	8	*f*	6 Id.	Concept. of the B. V. Mary.	29	8	30	James 1
15	9	*g*	5 Id.		31	9	32	2
4	10	*A*	4 Id.		33	10	34	3
	11	*b*	3 Id.		35	11	36	4
12	12	*c*	Pr. Id.		37	12	38	5
1	13	*d*	Idus	Lucy, Virgin and Martyr.	39	13	40	1 Pet. 1
	14	*e*	19 Kl. Jan.		41	14	42	2
9	15	*f*	18 Kl.		43	15	44	3
	16	*g*	17 Kl.	O Sapientia.	45	16	46	4
17	17	*A*	16 Kl.		47	17	48	5
6	18	*b*	15 Kl.		49	18	50	2 Pet. 1
	19	*c*	14 Kl.		51	19	52	2
14	20	*d*	13 Kl.	Fast.	53	20	54	3
3	21	*e*	12 Kl.	S. Thomas, Apostle & Mart.	....	21	....	1 John 1
	22	*f*	11 Kl.		55	22	56	2
11	23	*g*	10 Kl.		57	23	58	3
	24	*A*	9 Kl.	Fast.	59	24	60	4
19	25	*b*	8 Kl.	Christmas day.				
8	26	*c*	7 Kl.	S. Stephen, the first Martyr.				
	27	*d*	6 Kl.	S. John, Apostle & Evang.				
16	28	*e*	5 Kl.	Innocents' day.	....	25	....	5
5	29	*f*	4 Kl.		61	26	62	2 John
	30	*g*	3 Kl.		63	27	64	3 John.
13	31	*A*	Pr. Kl.	Silvester, Bishop of Rome.	65	28	66	Jude.

TO FIND EASTER FOREVER.

Golden Nos.	A.	B.	C.	D.	E.	F.	G.
I	April 9	10	11	12	6	7	8
II	Mar. 26	27	28	29	30	31	April 1
III	April 16	17	18	1	20	14	15
IV	April 9	3	4	5	6	7	8
V	Mar. 26	27	28	29	23	24	25
VI	April 16	17	11	12	13	14	15
VII	April 2	3	4	5	6	Mar. 31	April 1
VIII	April 23	24	25	19	20	21	22
IX	April 9	10	11	12	13	14	8
X	April 2	3	Mar. 28	29	30	31	April 1
XI	April 16	17	18	19	20	21	22
XII	April 9	19	11	5	6	7	8
XIII	Mar. 26	27	28	29	30	31	25
XIV........	April 16	17	18	19	13	14	15
XV.........	April 2	3	4	5	6	7	8
XVI........	Mar. 26	27	28	22	23	24	25
XVII.......	April 16	10	11	12	13	14	15
XVIII......	April 2	3	4	5	Mar. 30	31	April 1
XIX........	April 23	24	18	19	20	21	22

When ye have found the Sunday Letter in the uppermost line, guide your eye downward from the same till ye come right over against the Prime, and there is shewed both what month and what day of the month Easter falleth that year. But note that the name of the month is set at the left hand, or else just with the figures, and followeth not, as in other tables, by descent, but collateral.

CHAPTER X.

The two defects of the Old Style—Its defects no new discovery—Preliminary steps towards a reformation—Effected under Pope Gregory the Thirteenth—The reform not accepted in Great Britain—Consequent inconveniences of the Clergy—Captiousness of the Puritans.

THE Victorian Period,* or the Paschal Cycle, as it is commonly termed, was received, as we have seen, with great applause ; and it seemed at that time as if the Church were to have no further trouble in the designation of Easter. The Metonic Cycle, reduced to more accurate dimensions by the Alexandrian Bishops, had triumphed, after a struggle of two hundred years, over all its competitors ; and its ingenious combination with the Solar Cycle brought the Calendar of the Church, as was then thought, to a state of perfection, and secured its universal adoption.

But notwithstanding the laudable and persistent ingenuity with which it had been elaborated, the Calendar had two fundamental defects, which, though seemingly inconsiderable, were destined in the lapse of ages to work confusion, and to render its reformation imperatively necessary.

In the first place, the authors of the Calendar assumed that the year consisted of three hundred and sixty-five and a quarter days, and thus made the Calendar year longer than the true solar year. At the time of the Council of Nice, A. D. 325, the vernal equinox occurred on the 21st of

---

* In the language of chronology, a period consists of two or more *cycles ;* thus the Julian Period is the continued product of the Cycles of the Sun, the Moon, and the Indiction $(28 \times 19 \times 15 = 7980)$. But the distinction is not always observed, and the designation of the product of the Lunar and Solar Cycles as the Paschal Cycle is supported by usage.

March, and it was then supposed that it would continue ever afterwards to occur on the day set down in the Calendar as March 21st. The supposition would have been correct if the year had consisted, as the Calendar assumed, of exactly three hundred and sixty-five days and six hours; but as the true year was about eleven minutes shorter than the Calendar year, it is evident that the vernal equinox would in this proportion anticipate the day assigned to it in the Calendar. Now if we would know for our own satisfaction how long a time would elapse before eleven minutes a year would amount to a day, we may form an arithmetical series of which the first term is eleven, the common difference is eleven, and the last term is one day of twenty-four hours. Reducing the last term to minutes, the series stands thus : 11, 22, 33, ... 1440 ; and dividing the difference of the extremes by the common difference, and adding one to the quotient, we find $\left[\left(\dfrac{1440-11}{11}=129\right)+1\right]$ one hundred and thirty to be the sum of the series. Hence, as the Calendar gained on the sun at the rate of eleven minutes a year, it is evident that in one hundred and thirty years after the time of the Council of Nice, that is to say A. D. 455, the Calendar would have gained a day upon the sun, and consequently that the true day of the vernal equinox would be A. D. 455, the 20th of March, and not the 21st of March ; that in the year 585, the equinox would be the 19th of March, and in 715 the 18th of March, and so on, instead of the 21st. It is true that the reformers make the advance of the Calendar to be at the rate of one day in 133 years ; but this, as we shall see, is only one among several instances in which they wisely sacrificed mathematical precision, when it could be safely done, to the attainment of more important ends. Again :

The reform took effect A. D. 1582, and if we would satisfy ourselves as to the number of days the sun had then receded since A. D. 325, we may, on the same principle as before, divide the difference between 1582 and 325 by 130 and add one to the quotient; which will show that the Calendar had then advanced on the sun about ten days. These rough figures, which are used illustratively and not argumentatively, may help some readers to realize the fact that the Church three hundred years ago was led by the Calendar to celebrate her Easter ten days later than the time intended by the authors of the Calendar.

The other defect of the Calendar lay in assuming the correctness of the Lunar Cycle; that is to say, in assuming that once in every nineteen years there is an exact agreement of the solar and the lunar time.

This supposed agreement is exhibited in the following schedule:

SOLAR TIME.			LUNAR TIME.		
	Days.	*hrs.*		*Days.*	*hrs.*
Nineteen solar years, each 365 d. 6 h.......	6939	18	Nineteen lunar years of 354 days each; or, which is the same thing, 228 moons of 29½ d. each..........	6726	00
			In the space of 19 years were seven intercalated moons, six of 30 d. and one of 29 d	209	00
			Some cycles would have five leap years and others only four, making an average of 4¾ days to be added to the lunar time.......	4	18
Total solar time in 19 solar years	6939	18	Total lunar time in 19 solar years	6939	18

The hypothesis is not only specious, but is a remarkable approximation to the truth. If it had been precisely ac-

curate, the prime or golden number, set opposite to the day
of the month, as it used to be in the old calendar, would
have continued to indicate the day of the new moon with
sufficient correctness.   In fact it was only after long expe-
rience of its benefits that men began to suspect its error.
It was then discovered that " Although," to use the words
of Mr. Wheatly, " at the end of every nineteen years the
" moon changes on the very same day of the solar months
" on which it changed nineteen years before ; yet the
" change happens about an hour and a half sooner every
" nineteen years than in the former."   It is certain, indeed,
that in the course of nineteen solar years there are two
hundred and thirty-five moons ; but assuming the length
of the moon to be, as the modern computists make it,
29 d. 12 h. 44′ 3″ 11‴, or 29.53058 days, the account would
stand as follows :

	Days.	*hrs.*	*min.*
Nineteen solar years of 365 days 6 h. each	=6939	18	
Two hundred and thirty-five moons, each 29 d. 12 h. 44′ 3″ 11‴	=6939	16	31.2
Excess of solar time over the lunar in 19 years...... =		1	28.8

Now, assuming this to be the excess of the solar time
over the lunar in one cycle of nineteen years, it is evident
that at the end of every succeeding nineteen years the new
moon would fall 1 hour and 28.8 minutes sooner than the
time assigned to it by the Calendar, and if we would ascer-
tain how many years would elapse before this difference
would amount to a day, we have but to form a series, as
before, of which the first term and the common difference
is 1 hour 28.8 minutes, and the last term is a day of 24
hours, thus: 1.48, 2.96, ... 24 ; the sum of which
$\left[\left(\dfrac{24-1.48}{1.48}=15.2\right)+1=16.2\right]$ shows that the difference

amounts to a day in about sixteen lunar cycles ; that is to say (16.2 × 19 = 307.8) in about three hundred and eight years. The Gregorian reformers, however, with good reason, as we shall see on a future page, assumed the anticipation of the moon on the Calendar time to be equal to one day in three hundred and twelve and a half years. In 1582, when the Calendar was reformed, the difference amounted to about four days.

These defects at the time the Calendar was reformed were no new discovery. So early as the eighth century the venerable Bede had called attention to the deviation of Easter from the vernal equinox, or the time prescribed for its observance by the Council of Nice. In the thirteenth century the famous Roger Bacon not only proved the existence of the defects, but is also said to have pointed out with exactness the proper method of correcting them. The project of reform is also said to have been entertained by Sixtus the Fourth in the fifteenth century, and agitated at the Council of Constance. In July, 1510, as Sir Harris Nicolas informs us, on the authority of Rymer's *Fœdera*, Pope Leo the Tenth wrote to Henry the Eighth that the necessity of correcting the Calendar had been noticed in the Council of Lateran ; and requesting him to obtain the opinions of the most eminent professors of astrology and theology in his dominions on the subject, and to transmit them to Rome. In the latter part, however, of the sixteenth century, under the pontificate of Gregory the Thirteenth, the reformation was undertaken in earnest and prosecuted with that caution and foresight which, in matters of this sort, are characteristic of the Roman See. The subject was submitted to a body of astronomers and mathematicians, the most eminent of their age, which had been convoked at Rome for the purpose of considering it. Ten

years were devoted to its discussion and to the examination of the rival plans of reform which had been submitted to the assembly. The result was a preference for the plan of Aloisius and Antoninus Lilius, two brothers of Verona. The plan thus preferred was sent by the Pontiff to all the states and learned institutions of Catholic Europe, and having received the seal of their approval, was formally promulgated at Rome in March, 1582, and appointed to take effect in October of the same year ; at which time consequently the Old Style of the Calendar, as it soon came to be called, was formally abrogated, and the New Style was substituted in its place.

The men to whom the emendation of the Calendar was entrusted were not visionaries ; they took for their guide the certain experience of the past without becoming *entêtés* with the dreams of the future ; they sought to *reform* and not to *innovate.* We may be sure that changes, even needless changes, were proposed, which mere science would not resist. It was proposed, for example, to keep the equinox, as it then was, to the 11th of March. But what churchman is not grateful to the Catholic reformers who resisted so rude an attempt to disturb the old Paschal terms, etc., and adhered to March 21st, in literal compliance with the Nicene prescription ? The Church Calendar, the growth of centuries, the reformers religiously retained ; not eschewing even the name of *Julian,* which a preposterous accident had fastened upon it ; and aiming merely to remedy the few defects which time had revealed, they transmitted *the same Church Calendar* to the generations that succeeded them, with no other changes than such as were the result of a wise, temperate, and effectual reformation. *O si sic omnia!*

It is to the honour of the Church of Rome that while

the storms of religious controversy were raging around her, she undertook and carried to perfection a reform that demanded for its successful achievement the highest attainments of science and learning. Although the measure was an advance in civilization, a contribution of the discoveries of science to the wants of mankind, yet they who took the name and delighted in the distinction of the Reformed accepted the boon slowly and grudgingly, and chiefly as it was forced upon them by the exigencies of life. At least, as a general rule, the New Style was adopted by countries of the Roman obedience and rejected by the Protestants. Great Britain at first indeed gave promise of rising above the prejudices of religion. So early as March 16th, 1584–5, and 27th of Elizabeth, a bill was introduced into the House of Lords, entitled " An Act giving her Majesty authority " to alter and new make a Calendar according to the Cal- " endar used in other countries." But if the blossom was early the fruit was late ; the bill was read a second time in the House of Lords, and was heard of no more ; nor was it until 1752 that Great Britain, after all the nations but one that have accepted the reformation had preceded her, adopted the Gregorian Calendar ; and its adoption was finally brought about, not by the Bishops and Clergy, who were content, for some unexplained reason, to trudge on by the help of temporary makeshifts (enjoying, perhaps, the shouts of the people, " Give us back our eleven days " *),

---

* In 1752 it had become necessary to cancel *eleven* days in the Calendar. The allusion in the text is to Hogarth's picture of the Election Dinner, where the satirist reveals the popular feelings of the day by inserting a scroll with the above words in the mouth of one of the crowd. Sir Harris Nicolas, having mentioned the above circumstance, adds : " The feelings " of the English populace closely resembled those of the Chinese on a " similar occasion. The person employed to construct the Imperial " Almanack proved so ignorant of his business, that he inserted an inter- " calary month in the current lunar year, when it should have consisted

but by the courtly Lord Chesterfield, in concert with the
Earl of Macclesfield, Dr. Bradley, and other men eminent
for science.

The praise which is cheerfully accorded to the Roman
See for its reformation in one point, ought not, in fairness,
to be understood as palliating its neglect of reformation in
other points. The same Gregory who reformed the Calen-
dar, renewed the bull of Pius V excommunicating Elizabeth
and absolving her subjects from allegiance to their Queen,
and deprived James the First, in such wise as Papal au-
thority could deprive, of the kingdoms of England and
Ireland.* One may commend the reformation of the Cal-
endar, without being quite prepared to acknowledge the
unlimited subordination of the temporal to the spiritual
authority, or to regard one's country as a fief or appanage
of the Roman See.

It would be interesting to trace the progress of the refor-
mation of Gregory from its commencement to its conclu-
sion ; to note the principles which were laid down for its
guidance, as well as the first steps and subsequent stages
of its history ; the names of the learned who were chiefly
concerned in it ; the rival schemes that were proposed dur-
ing the ten years in which the subject was under considera-
tion, and the different judgments that were passed on the
work after its completion by the states and academies to
which it was submitted. But the historians whose oppor-
tunities of inquiry would have enabled them to throw light
on these topics, give us no information. Du Pin, a theolo-
gian who devotes a folio to the ecclesiastical history of the
sixteenth century, speaking of Gregory the Thirteenth,

" of only twelve lunations. At the suggestion of a missionary the Cal-
" endar was altered, ' but with some difficulty, the Chinese being sorely
" ' puzzled to know why they should be deprived of a whole month ! ' "

    * See Life of Dean Comber, p. 155.

merely says : " We owe to him the reformation of the Cal-
"endar." Rycaut, a civilian who had contributed a volume
(in continuation of Platina) to the Lives of the Popes, and
who had given a fair share of space to the Life of Gregory
the Thirteenth, dispatches the reformation of the Calendar
in four lines. And the inscription engraven by the people
of Rome on the monument of brass which Gregory, during
his lifetime, had caused to be erected to his memory in the
Capitol, records with pious gratitude his adornment of the
city with magnificent temples and statues, and his zeal for
the propagation of the Gospel to Heathen nations, but
makes no allusion to the work which has gained for his
name its distinctive honour.

An adherence to the " Old Paths," though a plain duty,
imposed by divine precept in matters of revealed religion,
is productive neither of safety nor comfort in matters which
are dependent on the discoveries of science. It is easy to
understand and even to sympathize with the views of ortho-
dox divines who have almost until our own times deplored the
banishment of Sternhold and Hopkins from our churches.
But it is not easy to comprehend the grounds on which an
intelligent body of clergy could oppose the introduction of
the Gregorian reformation into the Church of England.
Did they distrust the authorities to whom the work was
confided, and fear lest the reform of the Calendar would be
made a pretext for some radical change in its structure ?
I know too little of the history of the times to hazard an
opinion. Of one thing, however, we may be sure—viz.,
that the backwardness of the clergy to accept the reform
was disinterested ; since without it they were hampered
with difficulties to which we have already alluded, and two
of which a sympathy with our fathers in their lighter as
well as their graver trials moves us to describe.

8

First take the case of the primes or golden numbers. These, in the old Calendar, were set opposite to the days of the month which were respectively the days of the new moon. For several hundred years this method proved to be sufficiently accurate. But in the first part of the eigh‑ teenth century the moon had lost five days on the Calen‑ dar. Hence, in some editions of the Prayer Book, we find the editors supplementing the Calendar with a column intended to save as many as consulted it the trouble and possible errour of counting five days backward for them‑ selves. Take, for instance, a leaf from the Prayer Book of Dr. Nicholls, A. D. 1712. (See page 115.)

The Prayer Book begins with the second column and contains the golden numbers arranged as described in the last chapter. The first column belongs not to the Prayer Book but to the editor, and contains the same golden num‑ bers set five days back. In the second column, for exam‑ ple, 19 is set opposite to 25, which is the day of the new moon according to the Calendar ; but in the first column it stands opposite to the 20th, which is the correct day as given by the editor.

The other matter respected the observance of Easter. To give an example : In 1709 the Paschal full moon fell, according to the Calendar, on April 17th, which on that year was Sunday, and was accordingly kept as Palm Sun‑ day, while the Sunday following, April 24th, was held to be Easter. In that year, however, the astronomical full moon fell on Thursday, April 13th, which would make the following Sunday, April 17th, to be Easter. On such occa‑ sions, and even in the anticipation of them, the Puritans, whom God seems to have created to try the patience of His saints, were seized with inward spasms. Their con‑ science was *then* keenly alive to the duty of commemorating

NOVEMBER HATH XXX DAYS.

THE MOON HATH XXIX DAYS.

		1	*d*	Kalendæ.	All Saints, day.
18	13	2	*e*	4 No.	
7	2	3	*f*	3 No.	
		4	*g*	Pr. No.	
15	10	5	*A*	Nonæ.	Papists, Conspiracy.
4		6	*b*	8 Idus.	Leonard, Confessor.
	18	7	*c*	7 Id.	
12	7	8	*d*	6 Id.	
1		9	*e*	5 Id.	
	15	10	*f*	4 Id.	
9	4	11	*g*	3 Id.	S. Martin, B. and Confessor.
		12	*A*	Pr. Idus.	
17	12	13	*b*	Idus.	Britius, Bishop.
6	1	14	*c*	18 Kal. Dec.	
		15	*d*	17 Kal.	Machutus, Bishop.
14	9	16	*e*	16 Kal.	
3		17	*f*	15 Kal.	Hugh, B. of Lincoln.
	17	18	*g*	14 Kal.	
11	6	19	*A*	13 Kal.	
19		20	*b*	12 Kal.	Edmund, King and Martyr.
	14	21	*c*	11 Kal.	
8	3	22	*d*	10 Kal.	Cecilia, Virgin and Martyr.
		23	*e*	9 Kal.	S. Clement, I. B. of R. and M.
16	11	24	*f*	8 Kal.	
5	19	25	*g*	7 Kal.	Catherine, Virgin and Martyr.
13		26	*A*	6 Kal.	
2	8	27	*b*	5 Kal.	
		28	*c*	4 Kal.	
10	16	29	*d*	3 Kal.	Fast.
	5	30	*e*	Pr. Kal.	S. Andrew, Apostle and Martyr.

our Lord's Resurrection at Easter, and they became pro-
portionally tenacious of their right and privilege to observe
the day according to the rule of the Nicene Council and
the practice (the Gregorian Calendar had at this time been
generally adopted on the Continent) of all Christian
Churches. How could they then in conscience subscribe
their consent to the Prayer Book, which asserted what was
false in fact, involved them in dissent from all Christian
Churches, and might peradventure compel them (the year
then began on March 25th) to observe two Easters in one
year. The objection of the Puritans was a good reason
why the Church should adopt the reformed Calendar, and
had they urged it for this purpose, they would have de-
served to be commended ; but when they used it as a lever
to subvert the authority of the Church, and to estrange her
members from the peaceful and harmonious observance of
her festivals, they acted in the mere and wanton spirit of
faction. It is not my design to review the controversy
which was then waged with a class of men who stood more
in need, as South somewhere says, of Luke the physician
than of Luke the evangelist, and whose conscience was apt
to overflow with grief in proportion to their redundancy of
bile. Whoever is curious to see the arguments *in extenso*
may consult the elaborate note of Dr. Nicolls on the word
Calendar in his Introduction to the Prayer Book, or the
Preface of Dean Prideaux to the second part of his
" Connections." The latter good-humouredly remarks in
the outset : " It is a very odd thing that this sort of people
" who are against keeping any Easter at all, should raise
" any quarrel about the time of its observance. But since
" they are pleased to do so, I will here endeavour to give
" them full satisfaction."

But it is time we had returned from this digression to
the main design of our work.

CHAPTER XI.

THE object of the Church Calendar, both under the Old and the New Style, is twofold : 1. To exhibit a permanent and faithful delineation of solar time for the future ; such, for example, as shall designate the days on which the equinoxes shall forever hereafter occur ; and 2. To exhibit the agreement between the solar and the lunar time ; so as to keep the Paschal full moon (the first Sunday after which is Easter day) in its normal relation forever with the vernal equinox. The method of obtaining these results is not *scientific*, in the modern and restrained sense of the word. That is to say, it does not proceed upon *demonstration from first principles;* science, in this sense of the word, being very imperfectly known to the ancients, and being, moreover, even in its present state of perfection, too dim of vision—be it said under favour of the philosophers—to lay bare the secrets of the distant future as the Church has spread them before us in her Calendar. To attain this end, to foretell, for example, the day on which the Paschal moon, or any other moon, shall be full five thousand or ten thousand years hence, Science must come down from her throne, and condescend to accept the cycles which the custodians of the Church have treasured up in her traditionary lore, and verified by a long tract—long in the account of the world, though but a day in the corporate

life of the Church—of observation and experience. Long experience, indeed, was necessary to discover the defects of the Old Style ; but the discovery did not lead the Church to abandon her system of chronology or surrender it to the direction of the age ; on the contrary, she quietly applied herself to remove the defects of her system by the same patient learning and fertile ingenuity with which she had presided at its birth and watched over its growth ; and thus her Calendar was kept, as, in order to insure its integrity, it necessarily must be kept, wholly out of the proud domain of demonstrative science. The truth of this remark will appear when we shall have described, as we are now about to do, the means which were taken to remedy the two defects of the Old Style of the Calendar.

In A. D. 325 the sun crossed the line on the day which was marked in the Calendar as March the 21st. In A. D. 1582 the sun crossed the line on the day which was marked in the Calendar as March the 11th, showing that in the intervening one thousand two hundred and fifty-seven years the Calendar time had gained ten days on the solar time. To correct this error, and at the same time to retain, agreeably to ecclesiastical usage, the 21st of March as the day of the vernal equinox, it was only necessary to strike the ten nominal days out of the Calendar ; and accordingly it was decreed that the 5th day of October, when the New Style was to take effect, should be held and taken to be the 15th day of October. By this simple contrivance, backed by an authority competent to secure for it general acceptance, the Calendar, as far as this error was concerned, was at once restored to its original agreement with astronomical truth ; for as in 325, so also in 1583, the vernal equinox really fell on March the 21st, the day assigned to it by the Calendar.

The next step was to guard against a recurrence of the same error ; that is to say, to prevent the Calendar time from gaining on the solar time in the future, as it had gained in the past at the rate of one day in one hundred and thirty years. This end was effected by bringing the centurial years under the same law with other years ; that is to say, by retaining every fourth centurial year as a bissextile with two letters, and making the three centurial years next before it to be common years with only one letter apiece. Under the Old Style, every centurial year was accounted a leap-year of three hundred and sixty-six days, and had two letters assigned to it ; but under the New Style, every centurial year, the centuries of which cannot be divided by four without a remainder, is accounted a common year of three hundred and sixty-five days, and has but one letter assigned to it.

Here it is to be noted that as the Old Style assigned two letters to every leap-year of three hundred and sixty-six days, in order to bring it within the Calendar year of three hundred and sixty-five days, so the suppression of a letter in any leap-year of the Old Style is equivalent to the suppression of a day in the Calendar time.

It should be noted also that as 4 and all the multiples of 4, as 8, 12, 16, 20, 24, etc., can be exactly measured by 4, so the numbers which come, in arithmetical order, between any two of these consecutive multiples, as 5, 6, 7 ; 9, 10, 11 ; 17, 18, 19, etc., cannot be so measured, but, when divided by 4, leave a remainder. This fact, doubtless, suggested to the reformers their rule for the suppression of the centurial letters. For assuming as a convenient approximation to the truth, that, in order to the correction of the Calendar, one day was to be withdrawn from the Old Style in every one hundred and thirty-three years, or,

what is the same thing, three days in every three hundred and ninety-nine years, it is evident that the correction could be best made by suffering those centurial years, the centuries of which can be measured by 4, to have two letters under the New Style as they had under the Old, and by suppressing a letter in those centurial years, the centuries of which cannot be measured by 4. Hence it is that while the Calendar under both Styles makes the years 1600 and 2000 to be each a leap-year with two letters and three hundred and sixty-six natural days, it makes the years 1700, 1800, and 1900 (which were leap-years under the Old Style) to be common years under the New Style, each with only one letter and three hundred and sixty-five days.

But will not the Calendar now fall behind the sun? The danger of its doing so is a theme of speculation for mathematicians and astronomers, but is too distant and inconsiderable to be of any practical account. If it be true, as high authorities affirm, that the deduction should be one day in one hundred and thirty years instead of one day in one hundred and thirty-three years, the excess even then will not amount to a day before the year 5200, when it will be only necessary, by an exception to the Gregorian rule, to take the year 5200 for a common year instead of a leap-year to make our accounts as even as they were before. For the true measure of the solar year, according to Lalande, is 365 d. 5 h. 40′ 48″, which shows the excess of the Julian over the tropical year to be equal to 11′ 12″, or 11⅕ minutes. Consequently, in the lapse of four hundred years, the Calendar time gains on the Solar time 3 d. 2 h. 40′, which is two hours and forty minutes more than the three days cancelled in the Gregorian Calendar in four hundred years. Now, two hours and forty minutes is to a day of twenty-four hours as four hundred years is to three

thousand six hundred years, which shows that the deduction of three days in four hundred years from the Julian Calendar will keep the Calendar even with the sun for three thousand six hundred years. Now the first centurial year after the Gregorian reform went into operation was the year 1600 ; to which, if you add 3600, you have the year 5200 of the Christian era as the first year in which the excess of the true solar year will amount to a day. Others, building on more approved *data,* make the excess to be one day in three thousand eight hundred and sixty-six years ; and as this differs but little from four thousand years, they propose to modify the Gregorian rule by making the year 4000, and its multiples 8000, 12000, 16000, etc., to be common years. In this way they calculate that the commencement of the year would not vary more than a day from its present place in a thousand centuries.*

Of course, as the Calendar is founded on a cycle, and as there is no cycle the assumed phenomena of which are in exact accordance with the celestial phenomena, and as, moreover, the best astronomers are not precisely agreed in the measurement of the solar year, it is in vain to expect that there should be such an adjustment of the Calendar to the heavenly bodies as is absolutely perfect. But an adjustment like this of the Gregorian Calendar which varies only one day in three thousand six hundred years, and which, by a slight modification, might be made to vary only one day in a thousand centuries, is such an approximation to absolute perfection as practically leaves nothing to be desired. With our present information, it seems impossible that a better adjustment should be made, or that the venerable structure bequeathed to us by the Church should not continue to be used as long as time shall last.

---

* See Ency. Brit., art. *Calendar.*

CHAPTER XII.

HAVING described the method adopted by the re-
formers to adjust the New Style of the Calendar to
the true solar time, we are next to describe the method
whereby, in order to remedy the second defect of the Old
Style, they contrived to make the Calendar exhibit with
sufficient accuracy the days of the solar year on which the
changes of the moon would hereafter occur.

We have seen that under the Old Style the changes of
the moon fell behind the time assigned to them in the Cal-
endar at the rate of one day in three hundred years; an
error which, at the time of the reformation, had amounted
to four days. But the reformers themselves had created
another difficulty; for the withdrawal of a day from the
solar time in a centurial year would make the Calendar
exhibit the changes of the moon in that century one day
later than the truth required. Here, then, were two sources
of error to be guarded against of a directly opposite kind;
the one demanding the addition of a day to the Calendar
once in three hundred years, the other the deduction of a
day in every centurial year which was not a bissextile.
The correction of both these errors was essentially necessary
in order to keep the lunar time of the Calendar in accord-
ance with the solar time. The most obvious mode of cor-

rection was to set the Golden Numbers a day higher or a day lower in every century in which a change was necessary. But the reformers were laudably ambitious to bring their work so near to perfection that the Calendar, without the help of clerks and committees, or any sort of tampering, should *proprio vigore* proclaim with certainty and forever to all the members of the Church the days of her solemn feasts. To this end the use of the Golden Numbers for indicating the days of the New Moon was totally abolished, and the system of Epacts was substituted in their place.

That the reader may understand this system, I shall now lay the reformed Calendar before him. Some remarks explanatory of its design and structure may fitly follow it. But to show at once its chief use, I would first ask the reader's attention to its method of finding Easter ; and if he will compare the method of the New Style with that which was followed under the Old, he will be the better prepared to appreciate the peculiarities of the Hanoverian method which has been fastened upon us in our English and American Prayer Books.

To find Easter, then, for a given year, by the following Calendar, it is necessary to know the Epact for the year and the Sunday Letter for the year. Having found these, you enter the Calendar at the 8th day of March and glance your eye down the column of Epacts until you come to the Epact for the given year. The day of the month opposite to the Epact for the year is the day of the Paschal new moon, the fourteenth day from which (both inclusive) is the day of the Paschal full moon ; and the day following, which stands opposite to the Dominical Letter for the year, is Easter day.

Required Easter day for 1871 ; the Epact for the year being ix, and the Dominical Letter A.

Enter the Calendar at the 8th of March, and move down the column of Epacts till you come to ix ; the day of the month opposite to ix is March 22d, the fourteenth day from which, both inclusive, is April the 4th ; then look down the column of the Dominical Letters till you find A ; and the day of the month opposite to A is April the 9th ; which is Easter day for 1871.

In this way Easter day may be found for any year from its first institution to the end of time.

N. B.—The Epact for the year may be found in the Table for "The Time of Two Cycles of the Moon," given in our American Prayer Book.

THE REFORMED LUNAR CALENDAR.

JANUARY.			FEBRUARY.			MARCH.			APRIL.		
D. M.	LET	EPACTS.	D. M.	LET	EPACTS.	D. M.	LET	EPACTS.	D. M.	LET	EPACTS.
1	*A*	*	1	*d*	xxix.	1	*d*	*	1	*g*	xxix.
2	*b*	xxix.	2	*e*	xxviii.	2	*e*	xxix.	2	*A*	xxviii.
2	*c*	xxviii.	3	*f*	xxvii.	3	*f*	xxviii.	3	*b*	xxvii.
4	*d*	xxvii.	4	*g*	25, xxvi.	4	*g*	xxvii.	4	*c*	25, xxvi.
5	*e*	xxvi.	5	*A*	xxv,xxiv.	5	*A*	xxvi.	5	*d*	xxv,xxiv.
6	*f*	25, xxv.	6	*b*	xxiii.	6	*b*	xxv.	6	*e*	xxiii.
7	*g*	xxiv.	7	*c*	xxii.	7	*c*	xxiv.	7	*f*	xxii.
8	*A*	xxiii.	8	*d*	xxi.	8	*d*	xxiii.	8	*g*	xxi.
9	*b*	xxii.	9	*e*	xx.	9	*e*	xxii.	9	*A*	xx.
10	*c*	xxi.	10	*f*	xix.	10	*f*	xxi.	10	*b*	xix.
11	*d*	xx.	11	*g*	xviii.	11	*g*	xx.	11	*c*	xviii.
12	*e*	xix.	12	*A*	xvii.	12	*A*	xix.	12	*d*	xvii.
13	*f*	xviii.	13	*b*	xvi.	13	*b*	xviii.	13	*e*	xvi.
14	*g*	xvii.	14	*c*	xv.	14	*c*	xvii.	14	*f*	xv.
15	*A*	xvi.	15	*d*	xiv.	15	*d*	xvi.	15	*g*	xiv.
16	*b*	xv.	16	*e*	xiii.	16	*e*	xv.	16	*A*	xiii.
17	*c*	xiv.	17	*f*	xii.	17	*f*	xiv.	17	*b*	xii.
18	*d*	xiii.	18	*g*	xi.	18	*g*	xiii.	18	*c*	xi.
19	*e*	xii.	19	*A*	x.	19	*A*	xii.	19	*d*	x.
20	*f*	xi.	20	*b*	ix.	20	*b*	xi.	20	*e*	ix.
21	*g*	x.	21	*c*	viii.	21	*c*	x.	21	*f*	viii.
22	*A*	ix.	22	*d*	vii.	22	*d*	ix.	22	*g*	vii.
23	*b*	viii.	23	*e*	vi.	23	*e*	viii.	23	*A*	vi.
24	*c*	vii.	24	*f*	v.	24	*f*	vii.	24	*b*	v.
25	*d*	vi.	25	*g*	iv.	25	*g*	vi.	25	*c*	iv.
26	*e*	v.	26	*A*	iii.	26	*A*	v.	26	*d*	iii.
27	*f*	iv.	27	*b*	ii.	27	*b*	iv.	27	*e*	ii.
28	*g*	iii.	28	*c*	i.	28	*c*	iii.	28	*f*	i.
29	*A*	ii.				29	*d*	ii.	29	*g*	*
30	*b*	i.				30	*e*	i.	30	*A*	xxix.
31	*c*	*				31	*f*	*			

THE REFORMED LUNAR CALENDAR—Continued.

	MAY.			JUNE.			JULY.			AUGUST.	
D.M.	LET.	EPACTS.	D.M.	LET.	EPACTS.	D.M.	LET.	EPACTS.	D.M.	LET.	EPACTS.
1	b	xxviii.	1	e	xxvii.	1	g	xxvi.	1	c	xxv, xxiv.
2	c	xxvii.	2	f	25, xxvi.	2	A	25, xxv.	2	d	xxiii.
3	d	xxvi.	3	g	xxv, xxiv.	3	b	xxiv.	3	e	xxii.
4	e	25, xxv.	4	A	xxiii.	4	c	xxiii.	4	f	xxi.
5	f	xxiv.	5	b	xxii.	5	d	xxii.	5	g	xx.
6	g	xxiii.	6	c	xxi.	6	e	xxi.	6	A	xix.
7	A	xxii.	7	d	xx.	7	f	xx.	7	b	xviii.
8	b	xxi.	8	e	xix.	8	g	xix.	8	c	xvii.
9	c	xx.	9	f	xviii.	9	A	xviii.	9	d	xvi.
10	d	xix.	10	g	xvii.	10	b	xvii.	10	e	xv.
11	e	xviii.	11	A	xvi.	11	c	xvi.	11	f	xiv.
12	f	xvii.	12	b	xv.	12	d	xv.	12	g	xiii.
13	g	xvi.	13	c	xiv.	13	e	xiv.	13	A	xii.
14	A	xv.	14	d	xiii.	14	f	xiii.	14	b	xi.
15	b	xiv.	15	e	xii.	15	g	xii.	15	c	x.
16	c	xiii.	16	f	xi.	16	A	xi.	16	d	ix.
17	d	xii.	17	g	x.	17	b	x.	17	e	viii.
18	e	xi.	18	A	ix.	18	c	ix.	18	f	vii.
19	f	x.	19	b	viii.	19	d	viii.	19	g	vi.
20	g	ix.	20	c	vii.	20	e	vii.	20	A	v.
21	A	viii.	21	d	vi.	21	f	vi.	21	b	iv.
22	b	vii.	22	e	v.	22	g	v.	22	c	iii.
23	c	vi.	23	f	iv.	23	A	iv.	23	d	ii.
24	d	v.	24	g	iii.	24	b	iii.	24	e	i.
25	e	iv.	25	A	ii.	25	c	ii.	25	f	*
26	f	iii.	26	b	i.	26	d	i.	26	g	xxix.
27	g	ii.	27	c	*	27	e	*	27	A	xxviii.
28	A	i.	28	d	xxix.	28	f	xxix.	28	b	xxvii.
29	b	*	29	e	xxviii.	29	g	xxviii.	29	c	xxvi.
30	c	xxix.	30	f	xxvii.	30	A	xxvii.	30	d	xxv.
31	d	xxviii.				31	b	25, xxvi.	31	e	xxiv.

	SEPTEMBER.			OCTOBER.			NOVEMBER.			DECEMBER.	
D.M.	LET.	EPACTS.	D.M.	LET.	EPACTS.	D.M.	LET.	EPACTS.	D.M.	LET.	EPACTS.
1	f	xxiii.	1	A	xxii.	1	d	xxi.	1	f	xx.
2	g	xxii.	2	b	xxi.	2	e	xx.	2	g	xix.
3	A	xxi.	3	c	xx.	3	f	xix.	3	A	xviii.
4	b	xx.	4	d	xix.	4	g	xviii.	4	b	xvii.
5	c	xix.	5	e	xviii.	5	A	xvii.	5	c	xvi.
6	d	xviii.	6	f	xvii.	6	b	xvi.	6	d	xv.
7	e	xvii.	7	g	xvi.	7	c	xv.	7	e	xiv.
8	f	xvi.	8	A	xv.	8	d	xiv.	8	f	xiii.
9	g	xv.	9	b	xiv.	9	e	xiii.	9	g	xii.
10	A	xiv.	10	c	xiii.	10	f	xii.	10	A	xi.
11	b	xiii.	11	d	xii.	11	g	xi.	11	b	x.
12	c	xii.	12	e	xi.	12	A	x.	12	c	ix.
13	d	xi.	13	f	x.	13	b	ix.	13	d	viii.
14	e	x.	14	g	ix.	14	c	viii.	14	e	vii.
15	f	ix.	15	A	viii.	15	d	vii.	15	f	vi.
16	g	viii.	16	b	vii.	16	e	vi.	16	g	v.
17	A	vii.	17	c	vi.	17	f	v.	17	A	iv.
18	b	vi.	18	d	v.	18	g	iv.	18	b	iii.
19	c	v.	19	e	iv.	19	A	iii.	19	c	ii.
20	d	iv.	20	f	iii.	20	b	ii.	20	d	i.
21	e	iii.	21	g	ii.	21	c	i.	21	e	*
22	f	ii.	22	A	i.	22	d	*	22	f	xxix.
23	g	i.	23	b	*	23	e	xxix.	23	g	xxviii.
24	A	*	24	c	xxix.	24	f	xxviii.	24	A	xxvii.
25	b	xxix.	25	d	xxviii.	25	g	xxvii.	25	b	xxvi.
26	c	xxviii.	26	e	xxvii.	26	A	25, xxvi.	26	c	25, xxv.
27	d	xxvii.	27	f	xxvi.	27	b	xxv, xxiv.	27	d	xxiv.
28	e	25, xxvi.	28	g	25, xxv.	28	c	xxiii.	28	e	xxiii.
29	f	xxv, xxiv.	29	A	xxiv.	29	d	xxii.	29	f	xxii.
30	g	xxiii.	30	b	xxiii.	30	e	xxi.	30	g	xxi.
			31	c	xxii.				31	A	19, xx.

EXPLANATORY REMARKS.

In the first place, it may be well here to explain more particularly the word *Epact,* and to show the different shades of meaning in which it is used. 1. *Epact,* from a Greek word which means *to add,* denotes *primarily* the eleven days which are added to the lunar year to make the time equal to the solar year. In this sense the word is now seldom used. 2. When the moon is new, it is said to have no age ; on whatever day of one solar year the moon is new, its age on the same day of the next solar year is eleven days, and so always we may find the age of the moon on any day of one year by adding eleven to its age on the same day of the year preceding. Hence the word which in its primary sense denotes the excess of the solar year over the lunar year, passes by an easy transition to mean the age of the moon on any day of the solar year. In this sense we say that the reformed Calendar has at least one *Epact* (which may be any number from one to thirty, both inclusive) for every day of the solar year. 3. In the technical and more common sense, the Epact of the year means the age of the moon on the first day of January. Thus, in both the Old and the New Style, we speak of the *Epacts* which correspond to the Golden Numbers ; meaning by Epact the age of the moon at the beginning of that year of the Cycle which the Golden Number represents.

2. As the distinctive mark of the Old Style of the Calendar is that the Prime or Golden Number for the year is set opposite in every month to the day of the new moon in that month ; so the distinctive mark of the New Style of the Calendar is that the Epact for the year is always set, or rather naturally falls in every month opposite to the day of the New Moon.

3. As the lunar year, consisting of three hundred and fifty-four days, is divided into twelve moons, each moon contains nearly twenty-nine and a half days. For the sake of convenience, however, these moons are distributed in the Calendar into six of thirty days and six of twenty-nine days each. The French call the former " les lunes pleines," and the latter " les lunes caves ; " and following them we call the moon of thirty days a full moon, and that of twenty-nine days a cave moon.

4. The symbol ✳ which is placed in the Calendar opposite to January 1st, January 31st, March 1st, April 29th, and through the remainder of the Calendar opposite to some one day of each civil month, denotes that one moon is ended and that another is begun. As a moon is always more than twenty-nine days, and yet never fully amounts to thirty days, it is evident that the Epact of the day which ends one moon and begins another cannot be expressed by a whole number. For this reason, it is always indicated in the Calendar by ✳, a symbol which may be regarded as equivalent to thirty or nought.

5. It will be observed that the Epacts proceed in a reverse order to that of the days of the month. Thus the Epact of January 1st is ✳, that of January 2d is xxix, that of January 3d is xxviii, and so on to the 31st of January, when it again becomes thirty or nought. Next opposite to the 1st of February is xxix, and thence the Epacts proceed as before to the 1st of March, where the symbol ✳ again occurs. In this way they are continued, inversely to the days of the month, from the 1st of January to the 31st of December, both inclusive ; so that every day of the solar year has at least one Epact.

In counting the moon or the duration of a moon, we do not follow the order of the Epacts (for in certain months

two Epacts are assigned to one day), but we follow the
order of notation in the civil months ; and when we speak
of the moon of a particular month, as, for example, the
moon of January, the moon of February, etc., we mean the
moon which *ends* in that month.   Let us take the Calen-
dar, for example, as adapted to the first year of a cycle,
when the Golden Number is I and the Epact for the first
day of January is ✳.   The moon of January is that which
ends on the 30th of January.   From 1 to 30, both included,
are thirty days, and the moon of January is a full moon.
The moon of February is that which begins on the 31st of
January and ends on the 28th of February ; and as from
January 31st to February 28th, both included, are twenty-
nine days, the moon of February is a cave moon.   The
moon of March is that which ends on the 30th of March,
and is a full moon of thirty days.   The moon of April is
that which began on the 31st of March and ends on the
28th of April, and is a cave moon of twenty-nine days.
The moon of May is that which began on April 29th and
ends on May 28th ; from April 29th to May 28th, both
included, are thirty days, and the moon of May is a full
moon.   Proceeding in this way we find that the twelve
moons throughout the first year of the Cycle have been
alternately full and cave ; and the symbol ✳ opposite to
the 21st of December marks the beginning of the January
moon for the second year of the Cycle.   The Epact for the
second year is 11, and in the Calendar we find the Epact
11 opposite to the 20th of January ; from the 21st day of
December to the 19th of January, both always included,
are thirty days, and the moon which ends on the 19th of
January in the second year of the Cycle is a full moon.
Continuing the count throughout the second year, we shall
find the same alternation of full and cave moons until the

9th of December, which ends that lunar year. The moon which begins on the 10th of December is the January moon for the third year of the Cycle (the Epact of which is 22), which ends on the 8th of January. Passing on to the eighteenth year of the Cycle (the Epact being xii), we shall find that a moon ends on December 13th. This is the December moon for that year ; and the moon which begins on December 14th is the January moon for the nineteenth year of the Cycle. Continuing our count through this year (the Epact being xviii), we shall find that the twelfth moon ends on December 2d ; and that consequently the last year of the Cycle is closed on December 31st with a month of twenty-nine days ; which bring us round again to the first year of the Cycle, with * for the Epact.

6. It deserves also to be noted that in six months of the year, viz., in February, April, June, August, September and November, two Epacts, both in Roman characters, are assigned to one day of each month. The reason of these double Epacts being six times repeated is twofold. The first is to keep the lunar year within its proper limits. For the lunar year extends from the 1st of January to the 20th of December, both inclusive, and contains only three hundred and fifty-four days. Now, if the three hundred and sixty Epacts were distributed through the twelve months so that each day had only one Epact, they would extend six days beyond the lunar year, and terminate on the 26th of December instead of the 20th of December. But by assigning two Epacts to one day of the month for six months of the year, the whole number of Epacts is brought within the limits of the lunar year, and thus the remaining eleven days of the solar year, viz., from the 21st of December to the 31st, both inclusive, begin a new lunar year, and have the same Epacts as the first eleven days of the year

9

preceding, viz., from the 1st to the 11th of January, both inclusive.

The other reason for doubling the Epacts on one day of every alternate month is to preserve the distinction between the full moons and the cave moons. For since there are but thirty Epacts for each lunar month, and one of these is assigned to every day for six months of the year, the appropriation of the Epacts XXV and XXIV to the 5th of February, the 5th of April, the 3d of June, the 1st of August, the 29th of September, and the 27th of November, makes the number of lunar days in each of these months one less than in each of the other months. By this means the thirty Epacts, twelve times repeated, are, without abatement of their number or disturbance of their order, so disposed as to constitute for one half of the lunar year months of thirty days each, and months of only twenty-nine days each for the other half.

The Epacts " 25. XXV," and " 25. XXVI," and " 19. XX," may be better understood after an inspection of the Table which opens the next chapter. The rule in using the Calendar is : If the Epact for the year is XXV (Roman) and the Golden Number is less than 12, take XXV; but if the Golden number is more than 11, take 25 (Arabic). The Epact 25 has not yet been used since the Calendar was reformed, and will not come in play until the next century, viz., in 1916, and every other year of the same century the Golden Number of which is 17. The rule for the Epacts 19. XX opposite to the thirty-first of December is to use XX, with one only exception which is mentioned in the next chapter.

CHAPTER XIII.

THE reformed Lunar Calendar presents us with certain important results, but throws no light on the process by which these results are obtained. We see from it, for example, that the Epact for the year now falls opposite to the Paschal New Moon for the same year, and consequently that the error of the Old Style, which made it fall four or five days behind its normal time, is corrected. But how is this result obtained? Moreover, we are assured that the error will not again be repeated; but that, whatever be the year in any future century, the Epact for the year will always fall opposite to the day of the Paschal new moon in that year. Evidently, then, there must be some means for correcting this error in future and keeping the Calendar true, which do not appear in the Calendar itself. What are these means? The answer to these questions, which opens a new and interesting chapter in the history of the Calendar, will be found in the Table of Expanded Epacts, which calculates all possible Epacts, and adjusts them to the various Golden Numbers in every century in which they can possibly occur.

That the reader may have the subject advantageously before him, I shall first insert the Table, and then follow it with remarks intended to explain its structure and design.

THE EXPANDED TABLE OF EPACTS.

THE GOLDEN NUMBERS.

THE EPACTS.

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX
P	viii	xix	*	xi	xxiii	iii	xiv	xxv	vi	xvii	xxviii	ix	xx	i	xii	xxiii	iv	xv	xxvi
N	vii	xviii	xxix	x	xxi	ii	xiii	xxiv	v	xvi	xxvii	viii	xix	*	xi	xxii	iii	xiv	25
M	vi	xvii	xxviii	ix	xx	i	xii	xxiii	iv	xv	xxvi	vii	xviii	xxix	x	xxi	ii	xiii	xxiv
H	v	xvi	xxvii	viii	xix	*	xi	xxii	iii	xiv	xxv	vi	xvii	xxviii	ix	xx	i	xii	xxiii
G	iv	xv	xxvi	vii	xviii	xxix	x	xxi	ii	xiii	xxiv	v	xvi	xxvii	viii	xix	*	xi	xxii
F	iii	xiv	xxv	vi	xvii	xxviii	ix	xx	i	xii	xxiii	iv	xv	xxv	vii	xviii	xxix	x	xxi
E	ii	xiii	xxiv	v	xvi	xxvii	viii	xix	*	xi	xxii	iii	xiv	xxv	vi	xvii	xxviii	ix	xx
D	i	xii	xxiii	iv	xv	xxvi	vii	xviii	xxix	x	xxi	ii	xiii	xxiv	v	xvi	xxvii	viii	xix
C	*	xi	xxii	iii	xiv	xxv	vi	xvii	xxviii	ix	xx	i	xii	xxiii	iv	xv	xxvi	vii	xviii
B	xxix	x	xxi	ii	xiii	xxiv	v	xvi	xxvii	viii	xix	*	xi	xxii	iii	xiv	25	vi	xvii
A	xxviii	ix	xx	i	xii	xxiii	iv	xv	xxvi	vii	xviii	xxix	x	xxi	ii	xiii	xxiv	v	xvi
u	xxvii	viii	xix	*	xi	xxii	iii	xiv	xxv	vi	xvii	xxviii	ix	xx	i	xii	xxiii	iv	xv
t	xxvi	vii	xviii	xxix	x	xxi	ii	xiii	xxiv	v	xvi	xxvii	viii	xix	*	xi	xxii	iii	xiv
s	xxv	vi	xvii	xxviii	ix	xx	i	xii	xxiii	iv	xv	xxvi	vii	xviii	xxix	x	xxi	ii	xiii
r	xxiv	v	xvi	xxvii	viii	xix	*	xi	xxii	iii	xiv	xxv	vi	xvii	xxviii	ix	xx	i	xii
q	xxiii	iv	xv	xxvi	vii	xviii	xxix	x	xxi	ii	xiii	xxiv	v	xvi	xxvii	viii	xix	*	xi

The line at the top of the Table contains the Golden
Numbers, representing the nineteen years of the Lunar
Cycle. The lines below the Golden Numbers give the
Epacts proper to each year of the Cycle in different centu-
ries. As the moon can never be more than thirty days old,
these lines being thirty in number, are of course exhaustive
and contain all the Epacts possible. Different lines are
intended for different centuries; but as the same line is
sometimes used in two or more centuries, they are found to
make a complete revolution, not once in three thousand,
but once in eight thousand five hundred years. The letters
in the left-hand column, P, N, M, etc.; a, b, c, etc., are
merely indices, contrived for the sake of easy reference to
the different centuries for which the different lines of
Epacts are intended. As the Roman characters have been
preferred to the Arabic in the structure of the Table, some
capital letters are purposely avoided as *indices*, in conse-
quence of their resemblance to certain Roman numerals,
and the small letters are used instead of them.

In order to understand the design of the Table, let us
carefully reconsider the defects of the Calendar which the
reformers undertook to remedy. The Calendar itself,
though founded upon a Cycle, and therefore not to be
relied on for absolute precision, had yet been found, after
a trial of more than one thousand two hundred years, suffi-
ciently accurate for ecclesiastical purposes, with two excep-
tions. The first was that the moon fell behind the sun one
day in three hundred years; to remedy which defect it
became necessary to add one day in three hundred years to
the lunar time in order to adjust it to the solar time of the
Calendar. The second defect was that the Calendar ad-
vanced on the equinoxes at the rate of one day in one
hundred and thirty-three years. To obviate this defect in

future, the reformers made three out of every four centurial years, which had been leap-years in the Old Style of the Calendar, or years consisting of three hundred and sixty-six days, to be common years in the New Style, or years consisting of three hundred and sixty-five days ; and in thus deducting three days in every four hundred years from the solar reckoning, they were compelled at the same time to deduct three days in every four hundred years from the lunar reckoning, in order that the motions of the two luminaries might be evenly adjusted in the Calendar.

This then was the problem, viz., to provide for *adding* one day in every three hundred years and *deducting* three days in every four hundred years, in order to adapt the Calendar to ecclesiastical use. Or rather we should say (for the same provision might have been made in different ways) that the problem was to make the Calendar forever *adapt itself* to these changes without the necessity of any extraneous intervention or arbitrary alteration. Difficult as the problem was, a slight examination of the structure of the Table of Expanded Epacts will convince us that it was solved completely, and with marvellous simplicity and beauty.

The Council of Nice, from which the Church Calendar may be said to take its date, was held A. D. 325, in the third year of a Lunar Cycle, when the Epact for the year, or the age of the moon on the 1st of January, was * ; i. e., either 30 or 0. We set the Golden Numbers, or the years of the Lunar Cycle (with some one of which the current year of the Christian era always coincides), in a row at the head of the Table ; beginning with III, out of traditional respect for the venerable Council, continuing the Numbers to XIX, and completing the Cycle with the Numbers I and II. We then start from III, and under it set down * as the Epact for that year. We then find the Epacts

for the ensuing years by adding 11 to that of each preceding year and rejecting 30; with this only exception, that for XIX, the last year of the Cycle, we add 11 and reject 29, or, what is the same thing, add 12 and reject 30; the reason being that the intercalated month of the last year of the Cycle contains only twenty-nine days, while the others contain each thirty days. We set the Epacts thus formed in the same line with the first Epact ✳, and under the years to which they respectively belong, and designate the line as P. We then proceed to form another line. We begin, as before, under III, and make the Epact for that year 29, or one less than 30, and set it under 30 or its symbol ✳. We then form the Epact for the fourth year of the Cycle, which, adding 11 to 29 and rejecting 30, we find to be 10; and so we proceed with the other years of the Cycle, except the XIXth, when we add 12 and reject 30. We have thus formed a second line of Epacts, every one of which is one less than the corresponding Epact in the line P; and this second line we designate as N. In like manner, starting from III, we form a third line M, making the first Epact in the line M to be 28, or one less than the Epact above it in the line N, and then form as before the other Epacts for the remaining years. And so we continue to form the other lines H, G, F, etc., making the first Epact in each line, and consequently every other Epact in the same line, one less than the corresponding Epact in the line above, until we come to the lowest line, or that which has *a* for its index. When we have formed the line *a*, we have exhausted all the Epacts possible for the nineteen years; for the Epact of *a* under the Golden Number III is 1, and if we lessen it by unity, we are brought back to the line P, whence we set out. The result is that we have thirty different lines of Epacts, or all that possibly can be,

provided for use in different centuries ; and we see at once that in order to correct the Calendar, and prevent any disagreement of the lunar and solar time, we have only to pass from one line of Epacts to the line next below or next above. Suppose, for example, that after using the line P for a century, we had occasion to *deduct* one day from the lunar reckoning in order to compensate for the day lost in the solar reckoning by turning a leap-year of three hundred and sixty-six days into a common year of three hundred and sixty-five days ; in this case we *descend* from the line P to the line N, in which the Epact or age of the moon in every year of the Cycle is one less than in the line P. Or suppose we had occasion to *add* a day to the lunar time to compensate for its loss of one day in three hundred years ; in this case we *ascend* from the line P to the line *a*, the Epacts of which are severally one more than the Epacts in the line P.

We remarked that these corrections are not made by any exterior agency, or by a computist entrusted with the work of alteration, but that the Calendar is so contrived as to adjust itself to every correction necessary to be made. To show this, let us take the year 1871, which synchronizes with the tenth year of the Lunar Cycle. Referring to the Expanded Table of Epacts, we find, under the Golden Number X in the line C, that nine is the Epact for the year ; and on turning to the Calendar we find the Epact ix opposite to the 22d of January, the 20th of February, the 22d of March, the 20th of April, the 20th of May, the 18th of June, the 18th of July, the 16th of August, the 15th of September, the 14th of October, the 13th of November, and the 12th of December ; which shows that these were the days of the months on which one moon was ended and another began. Now let us take a year in the next cen-

tury, say 1909, which also synchronizes with the tenth year
of the Cycle. In the next century we descend one line in
the Expanded Table, and under the Golden Number X
in the line B we find viii, which is the Epact for 1909.
Referring to the Calendar, we find the Epact viii set
opposite to the 23d of January, the 21st of February, the
23d of March, the 21st of April, the 21st of May, the 19th
of June, the 19th of July, the 17th of August, the 16th of
September, the 15th of October, the 14th of November, and
the 13th of December ; which are the days of the Ecclesias-
tical new moons in the year 1909. Thus, to find the eccle-
siastical new moon and the feasts depending on it, we have
never occasion to " change the place of the Golden Num-
" bers," to set them a day lower in one century and a day
higher in another, or to tamper with the Calendar in any
way whatever. The reformers have done the whole work
to our hands, and with the Expanded Table of Epacts and
the Perpetual Lunar Calendar, we may dispense with all
other machinery. The reformed Calendar alone, with the
Epacts adjusted forever to the Golden Numbers by the
Expanded Table, is adapted to every century and regulates
itself for all time.

What lines are proper to different centuries, and how we
were brought to the line which we are now using, are
points which we shall presently explain. All that we here
aim to show is that the reformers have made an effectual
provision for keeping the lunar time of the Calendar forever
adjusted to the solar time. For to this end all that is
necessary is in different centuries to use different lines of
Epacts in order to determine the Epact for the year ; to
descend a line in those centuries in which a day is to be
deducted from the age of the moon, and to ascend a line in

those centuries in which a day is to be added to the age of the moon.

These two corrections of the Calendar (which are always made, if made at all, at the beginning of a century) are called the *solar* and *lunar* equations ; the one consists in the deduction of a day from the age of the moon three times in four hundred years ; and this is called the SOLAR EQUATION, as being designed to adjust the lunar time of the Calendar to that of the sun ; the other consists in the *addition* of a day to the age of the moon once in three hundred years ; and this is called the LUNAR EQUATION, as being designed to guard against the fault of the lunar cycle and adjust the Calendar to the motion of the moon. To effect the former change we *descend* a line and so *diminish* the Epacts by unity ; and to effect the latter change we *ascend* a line and so *augment* the Epacts by unity. Now, whatever be the Epact for the year when either of these equations is required, it can never be less than one or more than thirty ; and as the Table contains thirty lines of Epacts, or all which can possibly be, it evidently provides for making the necessary equations for any number of centuries ; in fact as long as the sun and moon shall endure.

It is not to be inferred from what has been said that a change in the line of Epacts is made in every century. Provision is made for such change if it be necessary. But it is not always necessary ; for two and even three centuries may elapse without any change being required. How this comes to pass will be explained in a future paragraph ; at present, suffice it to say that from A. D. 1582 to A. D. 2200, being a period of more than six hundred years, there will have been in all but two changes in the lines of the Epacts.

Hence it will be seen that the change of the Epacts, which, if made, is made (as above remarked) in the beginning of a century, is governed by the three following rules:

1. In a centurial year in which the bissextile day is omitted, if the lunar equation is not to be made, the Epacts *descend* and are *diminished* by unity.

2. In a centurial year in which the bissextile day is not omitted, and in which the lunar equation is to be made, the Epacts *ascend* and are *increased* by unity.

3. In a centurial year in which the bissextile day is omitted and the lunar equation has become due ; or in which the bissextile is not omitted and the lunar equation is not required, no change is to be made, but the Epacts are to remain the same as they were in the century next preceding.

A few remarks will naturally follow in reference to the use of the Table, and to some peculiarities which belong to it:

1. One use of the Expanded Table of Epacts is to show the Epact for the year ; and when this is known, a reference to the Lunar Calendar will show the days of the new moon in that year.

1. The Epact for the year is found under the Golden Number for the year in the line of Epacts proper to the century.   Thus the Golden Number for 1869 is VIII ; and under VIII, in the line C (which is the line of Epacts in use from 1700 to 1899 inclusive), is xvii.   The Epact, therefore, for 1869 is xvii ; and opposite to xvii in the Lunar Calendar you find the days of the ecclesiastical new moon for the said year 1869.

2. In the Old Style of the Calendar, the first Epact, or that which answered to the first year of the Lunar Cycle, was always xi, and consequently the correspondence be-

tween the Epacts and the Golden Numbers was invariably the same. In the New Style of the Calendar, however, this uniformity connot be preserved ; and the reason is, that every change in the line of Epacts begets a change in the correspondence between the Epacts and the Golden Numbers. The first line of Epacts which was used after the Calendar was reformed was D ; and if we examine the Expanded Table, we shall see that the Epact which corresponds to the first year of the Cycle is one, and that consequently the correspondence stood as follows :

G. N.......	I,	II,	III,	IV,	V,	VI,	etc.
Epacts.....	1,	12,	23,	4,	15,	26,	etc.

In the year 1700 there was a descent to the line C, which is still in use ; and it is according to this line that the correspondence in Wheatly and other books is given as follows :

G. N......	I,	II,	III,	IV,	V,	VI,	VII,	VIII,	IX,	X,	XI,	XII,
Epacts....	*,	11,	22,	3,	14,	25,	6,	17,	28,	9,	20,	1,
G. N......	XIII,	XIV,	XV,	XVI,	XVII,	XVIII,	XIX.					
Epacts....	12,	23,	4,	15,	26,	7,	18.					

We have been so long accustomed to this arrangement that we are apt to regard it as permanent ; but in the year 1900 we shall descend to the line B, when the Epact for the first year will be 29 and the correspondence will stand as follows :

G. N......	I,	II,	III,	IV,	V,	VI,	VII,	VIII,	IX,	X,	XI,	XII,
Epacts....	29,	10,	21,	2,	13,	24,	5,	16,	27,	8,	19,	*,
G. N......	XIII,	XIV,	XV,	XVI,	XVII,	XVIII,	XIX.					
Epacts....	11,	22,	3,	14,	25,	6,	17.					

3. It will be seen that in certain lines of Epacts (eight in all) of the Expanded Table, the Epacts xxiv and xxv both occur, and that in these lines xxvi does not

occur.   Now, seeing that in the Lunar Calendar xxiv
and xxv are both set opposite to one day of the month,
if the rule that the Epact for the year falls opposite to the
New Moon were adhered to in these cases, the inference
would be that there would be a New Moon on one and the
same day twice in the same Cycle; which would be con-
trary to fact.   To guard against this error, the Epact
twenty-five is distinguished from the rest of the series ; for
when in the Expanded Table it falls under a Golden Num-
ber less than twelve, it is then indeed printed in Roman,
and is set in the Lunar Calendar together with xxiv, and
is used instead of it.   But when the Epact twenty-five falls
under a Golden Number greater than eleven, it is always
25, in Arabic, and is set in the Lunar Calendar with
xxvi opposite to a different day of the month from xxv,
and is used instead of xxvi ; since xxvi never occurs, and
consequently cannot be used, in those lines of Epacts which
contain both twenty-four and twenty-five.

4. The Epacts 19 and xx opposite to December 31st
are a remarkable instance of the minute accuracy of the
Gregorian reformers.   The rule is to take the Epact xx
for that day ; but there is one exception, and that is when
the Epact xix falls under the Golden Number xix.   For the
intercalary month which is annexed to the last year of the
Cycle contains only twenty-nine days ; and as the Epact
xix falls opposite to the 2d of December, it was necessary
to put the same Epact 19 by the side of xx to show that
this lunation, contrary to the usual order, ended and the
next began on the 31st of December, and thus to keep the
number of days of this lunation and the first of the year
following within the limits of one conjunction.   This ex-
ceptional case can happen only in years the Golden Number
of which is XIX in the line D, which was in use from 1600

to 1700, and will not be used again before the year 8600, and yet special provision is made for it.

It now only remains to show the reason of the lunar equation being determined to certain centuries rather than to others, and how it happened that the line **D** of the Expanded Table of Epacts came to be used in preference to any other line of the Table at the time the Calendar was reformed.

In regard to the centuries selected for making the *solar* equation there can be no difficulty; for when we say that in 1582 the Calendar was made to accord with the equinoxes by the elimination of ten days from the month of October, and that to preserve this accordance in future one day is to be deducted from the Calendar in every one hundred and thirty-three years, our statement shows the precise time at which the first solar equation (if we may apply this term to the cancelling of the ten days in 1582) was made, and from which all future solar equations are to be reckoned.

But as to the *lunar* equation the case is different; for there is nothing to determine us to one year rather than another as the epoch from which these equations are of necessity to be numbered. We see that in order to exhibit the changes of the moon, as nearly as may be, in accordance with the motion of the sun, we must ascend one line in the Expanded Table of Epacts, that is, we must add one day to the Calendar in every three hundred and twelve and a half years, or, to speak in round numbers, one day in every three hundred years; and we see also that in order to do this we must have some epoch from which to proceed, some definite year from which to count the tercenaries in order to ascertain the centuries in which the lunar equation is to be made. But what *is* the epoch from which we are

to begin the reckoning ?   The Calendar itself dates from
A. D. 325, the year of the Council of Nice, and as the
changes of the moon were then correctly assigned to the
days of the solar year, the natural presumption is that we
are to take A. D. 325 for our starting point.   But while
the reformers of the Calendar *did* take the line P (which is
the line of Epacts for the century in which the Council
met) as the line from which to ascend in making the lunar
equations, it is a curious fact that they did *not* take the
year of the Council as the epoch from which to proceed in
reckoning these equations, but that they chose a year which
was more than two centuries subsequent.   And the reason
for this procedure is still more curious ; for it amounts in
fact to this, viz., lest the Calendar should be too accurate,
that is to say, too near to the astronomical facts.   Scientific
men will at first smile at this seeming paradox, but on
reflection they will at least confess that the course adopted
was necessary in order to achieve one main design of the
Calendar.   For the computations of the Calendar being
founded on the use of a cycle, are of course liable to differ
a day or two from the astronomical computations.   Now if
the Nicene age, with P for its line of Epacts, had been
selected as the epoch from which the lunar equations were
to be reckoned, the Calendar full moons might fall some-
times a day earlier than the astronomical full moons ; and
hence it might happen that Easter day according to the
Calendar would be the Sunday after the Paschal full moon,
and yet astronomically and in fact would be the day of or
the day before the full moon.   The reformers, therefore,
while they took the line of Epacts proper to the Nicene
age, took also in connexion with it a later date, viz., A. D.
550, as the epoch from which the centuries proper for
making the lunar equations were to be counted ; and hence

it is that although the Calendar new moons may be one, two, or even three days *later*, yet they never arrive *earlier* than the astronomical new moons.

In calculating the lunar equations, two things are to be noted : 1. That the equation is made at the beginning of a century ; and 2. That the proximate number of $312\frac{1}{2}$ was chosen in preference to one more rigidly correct, because the number twelve and a half is a measure of one hundred as it is also of fifty. Now it is evident that to add one day to the Epacts in every three hundred and twelve and a half years is the same thing as to add eight days in two thousand five hundred years, or four days in one thousand two hundred and fifty years (for $312\frac{1}{2} \times 8 = 2500$, and $312\frac{1}{2} \times 4 = 1250$). Hence it was determined that in the course of every period of two thousand five hundred years there should be eight lunar equations ; the seven first to be made at intervals of three hundred years, and the last or eighth after an interval of four hundred years. On the same principle three equations, each after an interval of three hundred years and one after an interval of three hundred and fifty years, would cover a period of one thousand two hundred and fifty years.

Now let us assume A. D. 550 as the year from which the equations are to be reckoned, and P as the line of Epacts from which to ascend. We set out from the year 500, in order that every period of three hundred years, which is necessary for a lunar equation, may be reckoned from and made at the beginning of a century. An interval of three hundred years brings us to the year 800 as the century in which the first lunar equation is to be made ; and in order to make it we ascend one in the Table of Epacts, that is, from the line P to the line a. Another three hundred years brings us to the year 1100, when we ascend to the

10

line b. In three more centuries we come to the year 1400 and to the line c in the Expanded Table of Epacts. In the year 1582 ten days were expunged from the Calendar, and consequently the new moons happen ten days later; this requires us to *diminish* the Epacts ten days, and to do this we *descend ten lines* in the Table; that is to say, starting from the line c, we descend through b, a, P, N, etc., till we come to the line D. Hence it was that the line D came into use in 1582 when the Calendar was reformed. Thenceforward not only the lunar but also the solar equation was to be made. The year 1600 was a leap-year, and for this reason the solar equation was not required; and as three hundred years had not elapsed since the last lunar equation A. D. 1400, the time had not come for another lunar equation; consequently there was no change in the line of Epacts, and the line D continued to be used until 1699 inclusive. In the year 1700, although three hundred years had elapsed since A. D. 1400, yet the lunar equation was deferred until the year 1800, in order that the next or fourth lunar equation might consist of three hundred and fifty years; which, added to the three previous equations of three hundred years each, would make the thousand two hundred and fifty years since the year 550, from which it was decided that the lunar equations were to be reckoned; and one thousand two hundred and fifty years added to the year 550 brings us to the year 1800, after which the lunar equations would continue to be made forever at the rate of eight in two thousand five hundred years. In 1700, however, the withdrawal of the bissextile day rendered necessary the solar equation; and accordingly the line D of the Expanded Table was discontinued and the line C came into use, the effect of which was to diminish the Epacts by unity. In 1800, which is also accounted a common year in

the New Style, the withdrawal of the bissextile again rendered necessary the solar equation; but in 1800 the time had come, as shown above, for the lunar equation; and as the two corrections are diametrically opposite, the former requiring us to diminish, the latter to augment the Epacts by unity, it is evident that no change was required; and hence the line C, which began to be used in 1700, still continues to be used, and will so continue until the year 1899 inclusive. The year 1900 being also a centurial year, the centuries of which cannot be measured by four, will also demand the solar equation; and as there will be no lunar equation to offset it, the Epacts will be lessened by unity, and we shall descend to the line B. The year 2000, its number of centuries being divisible by four, will be a bissextile under the New Style as it was under the Old; consequently there will be no solar equation, and as the time will not have come for the lunar equation, there will be no change in the Epacts, and the line B will continue in use. In the year 2100, both equations will be called for, but as they will neutralize one another, no change in the line of Epacts will be required, and the line B, which was introduced in 1900, will continue to be used until the end of the year 2199. In 2200 the solar equation, and it alone, will be made, and we shall descend to the line A. In 2300 the solar equation will again occur, and as there will be no lunar equation to compensate it, we shall descend to the line u. The year 2400 is a bissextile in which there can be no solar equation, but then the lapse of three hundred years will require the lunar equation, and we shall consequently return to the line A. In like manner we are to proceed in all future centuries; observing that after seven lunar equations shall have been made at intervals of three hundred years, the eighth is to be made after an interval

of four hundred years ; one hundred years being added to the last equation in order, as already explained, to absorb the twelve and a half years which were omitted in each of the preceding seven ; so that the augmentation of the Epacts may be equal to one day in three hundred and twelve and a half years. The first interval of four hundred years will occur between the years 3900 and 4300, and thus complete a period of two thousand five hundred years, counting from the year 1800. The second will occur between the years 6400 and 6800, which, counting from the year 4300, will complete another period of two thousand five hundred years.

What has been said will be better understood by an inspection of the annexed Table, taken from the " De Doctrinâ Temporum " of Petavius. (See page 149.)

This Table contains five columns. In the first column are the days (besides those that were expunged in 1582) which belonged indeed to the Old Calendar, but which are omitted in the reformed Calendar. The second column contains the *indices* or *letters* of the several lines of Epacts set opposite to the centuries in which they are to be used ; the centuries themselves being placed in the third column. The letter B in the fourth column marks the years from 1 to 1400, which were bissextile in the Old Calendar ; and after the year 1582, those centuries which are bissextile in the New or reformed Calendar. In the fifth column the single asterisk * serves to designate the lunar equation which is to be made at the end of three hundred years ; and the double asterisk the lunar equation which is to be made at the end of four hundred years. For the sake of completeness, the Table is made to begin with the Birth of Christ, at which time the Epacts would evidently have been one less than they were three hundred years afterwards

TABLE OF THE EQUATION OF THE EPACTS.

Days omitted besides the 10.	Indices.	Years.	Bis.	
	N	1	B.	
	P	325	B.	
	P	500	B.	
	a	800	B.	*
	b	1100	B.	*
	c	1400	B.	*
TEN DAYS CANCELLED.				
	D	1582		
	D	1600	B.	
1	C	1700		
2	C	1800		* *
3	B	1900		
3	B	2000	B.	
4	B	2100		*
5	A	2200		
6	u	2300		
6	A	2400	B.	*
7	u	2500		
8	t	2600		
9	t	2700		*
9	t	2800	B.	
10	s	2900		
11	s	3000		*
12	r	3100		
12	r	3200	B.	
13	r	3300		*
14	q	3400		
15	p	3500		
15	q	3600	B.	*
16	p	3700		
17	n	3800		
18	m	3900		
18	n	4000	B.	*
19	m	4100		
20	l	4200		
21	l	4300		* *
21	l	4400	B.	

Days omitted.	Indices.	Years.	Bis.	
22	K	4500		
23	K	4600		*
24	i	4700		
24	i	4800	B.	
25	i	4900		*
26	h	5000		
27	g	5100		
27	h	5200	B.	*
28	g	5300		
29	f	5400		
30	f	5500		*
30	f	5600	B.	
31	e	5700		
32	e	5800		*
33	d	5900		
33	d	6000	B.	
34	d	6100		*
35	c	6200		
36	b	6300		
36	c	6400	B.	*
37	b	6500		
38	a	6600		
39	P	6700		
39	a	6800	B.	* *
40	P	6900		
41	N	7000		
42	N	7100		*
42	N	7200	B.	
43	M	7300		
44	M	7400		*
45	H	7500		
45	H	7600	B.	
46	H	7700		*
47	G	7800		
48	F	7900		
48	G	8000	B.	*
49	F	8100		

at the Council of Nice ; and therefore the line N is set opposite to the first year of the Christian era. Thus the Table shows at a glance the history—past and prospective —of the two equations ; the years from which they may be said to take their beginning, the centuries in which they are made, the line of Epacts proper to each century, and the number of days which have been expunged, or which hereafter will be expunged, from the Old Style of the Calendar, in order to reform it or adapt it to the New Style. The Table extends to eight thousand five hundred years, because (one line of the Epacts being used sometimes for two or three centuries together, and at other times the same line being used twice) this is the least period in which the entire thirty lines of the Epacts can be brought into play. But as far as the system is concerned, we may, at the end of one revolution of eight thousand five hundred years, enter on another of the same duration, and use the same Table over again ; and so continue for perpetual ages.

Clavius, with consummate ingenuity, has reduced the whole into a brief compendium, called " The Perpetual " Cycle of the Epacts ; " which, like the Table of the Equations, is used for finding the Epact of the year.

To form the compendium, you begin with A. D. 325, the year of the Nicene Council, when the Golden Number was III, the moon was new on the 1st of January, and P was the index for the century. Write first *, the symbol of the *interlunium* = 0 or 30, and set over it P. Form the Epacts from * by continually adding eleven, until you have completed a Cycle ; that is, until you come to an Epact which, increased by eleven, brings you back to the symbol from which you started ; and as you have already set P over the symbol *, so, in like manner, over each succeeding Epact set the index which stands at the left of the said

Epact under the Golden Number III in the Expanded Table of Epacts. You will then have the thirty Epacts of the Cycle, and over them the thirty letters which are indices for the centuries. The compendium will then stand as follows :

<div align="center">THE PERPETUAL CYCLE OF THE EPACTS.</div>

P.	l.	C.	c.	p.	F.	f.	s.	M.	i.	A.	a.	m.	D.	d.	q.
*	xi	xxii	iii	xiv	xxv, 25	vi	xvii	xxviii	ix	xx	i	xii	xxiii	iv	xv

G.	g.	t.	N.	k.	B.	b.	n.	E.	e.	r.	H.	h.	u.
xxvi	vii	xviii	xxix	x	xxi	ii	xiii	xxiv	v	xvi	xxvii	viii	xix

By means of this compendium, we may find at once the Epact for a given year in any century ; having only the Golden Number for the given year and the index of the century (which you get from the Table of Equations) in which the given year occurs. Thus : Look in the compendium for the letter which is the index of the century ; and having found it assume the third place (both inclusive) to the left to be the place for the Golden Number I ; and from I count to the right (beginning the Cycle anew if necessary), until you come to the Golden Number for the given year ; and there you find the Epact for the said year. For example :

Required the Epact for 1872, the Golden Number being eleven.

In the Table of the Equation of the Epacts you find that the index for 1800 is C ; look for C in the compendium, and having found it, assume that the third place to the left $\left(\text{which is } \dfrac{\text{P.}}{*}\right)$ is the place for the Golden Number I ; count

thence to eleven (both inclusive), and in this place you find $\frac{A}{xx}$; which shows that xx is the Epact for 1872.

Required the Epact for 1918.

The index of the century is B, and the Golden Number for the given year is 19. Look for B in the compendium, and let the third place to the left $\left(\text{viz., } \frac{N}{xxix}\right)$ be the place for the Golden Number I ; count thence up to nineteen and you come to $\frac{s}{xvii}$, showing that xvii will be the Epact for A. D. 1918.

P. S.—In " The Table of Equations," etc., page 149, the reckoning begins with the first year of the Christian era, and is continued to the line F. A. D. 8100. In 8200 the solar equation will require us to descend to the line E. In 8300 the two equations neutralize one another, and in 8400 neither equation will be necessary, and consequently the line E will continue in use until A. D. 8499. In 8500 the solar equation will oblige us to descend to the line D ; the same line with which the reformed Calendar began in A. D. 1582. Whence it appears that a period of 8500 years is necessary for a complete revolution of the Epacts.

CHAPTER XIV.

THE reformation of the Calendar in reference to those ends which fit it for perpetual use, was purchased at the expense of some advantages in matters of less moment. In particular, the conversion of certain bissextile years into common years rendered the order of the Dominical Letters which was in use before the reformation inapplicable to subsequent times ; and the readjustment of the Letters not only marred the simplicity of the old order, but deprived us also of certain conveniences which were peculiar to it. The Church, however, still continues to use the same Dominical and Ferial Letters which she had used for a thousand years before the reformation, and for the same important purposes ; and hence it is incumbent on us to investigate the changes which were introduced and the effects of them.

Two changes were made in the Dominical Letters, the one immediate and the other prospective. In the first place, ten Calendar days were at once cancelled ; in consequence of which the day which in the Old Style would have been Wednesday, the 17th of October, with its ferial letter *c*, became in the New Style Sunday, the 7th of October,

with C for the Dominical Letter. In the second place, it was determined that three out of every four secular years which had been bissextile years in the Old Style, with two letters each, should be taken to be common years under the New Style, and consequently have each but one letter.

Let us examine these provisions more particularly.

The reformation went into operation October 5th, 1582, and its first effect was to cancel ten nominal days in the Calendar, viz., the days from the 5th to the 14th of October, both inclusive. In that year the Dominical Letter of the Old Style was G; and as *a* is the proper letter for the 1st of October, the month began in that year on Monday. Hence the suppression of the ten nominal days brought Sunday to the letter *c*, and consequently made C the Dominical Letter of the New Style for the rest of the year; as may be seen from the schedule in the margin, where the first day of October being in that year Monday, the fourth was Thursday, and, not counting the ten cancelled days, the fifth was Friday, the sixth was Saturday, and the seventh (formerly the seventeenth) was Sunday, with C instead of G for the Dominical Letter for the rest of the year 1582. To this change the Letters for subsequent years of course conformed, so that from Sunday, October 7th, 1582, New Style, the Dominical Letters would move in retrograde order, as follows;

OCTOBER.	
Days.	Let.
1	*a*
2	*b*
3	*c*
4	*d*
5	*e*
6	*f*
7	*G*
8	*a*
9	*b*
10	*c*
11	*d*
12	*e*
13	*f*
14	*G*
5	*a*
6	*b*
7	*c*

C	B	A G	F	E	D	C B	A	G	F	E D	C	B	A
G F	E	D	C	B A	G	F	E	D C	B	A	G	F E	D

and this order was continued until the year 1700, when it was interrupted, as we are next to explain, by the withdrawal of one of the centurial letters.

The effect, then, of the other change, viz., that which in three centuries out of every four required the conversion of the secular years from bissextiles with two letters into common years with but one letter each, will be best understood by a reference to the following Table, which contains the Dominical Letters arranged according to the New Style for the first four thousand years of the Christian era.

This Table, like that for the Old Style, assumes that the Christian era began in the tenth year of the Solar Cycle; and consequently B, which denotes the tenth year of the Cycle, is set opposite to the first year of the Christian era. The letter which is next to B in the Cycle, in the retrograde order, is C; C, therefore, is set next above B, and is used in the construction of the Table for a Centurial Letter. We have not D C, as in the corresponding place, in the Table for the Old Style, but only C, because the centuries which stand above it, and for which it is to be used, are such as are to be taken for common years in the New Style.

From B the letters proceed the same as in the Old Style, until we come to the year 199 inclusive. The letter for 199 is F; and as the year 200 is a common year, we have not E D, as in the Old Style, but only E; the D passing on to the next year. The letter for 299 is A, and as the year 300 is also a common year, it has not G A, but only G, leaving the A for the year following. The year 399 is C, and as the year 400 is a bissextile, it takes the next two letters, viz., B A. The year 499 is D, which gives us C for the year 500, the same as for the year 100; which shows that the permutations of the Centurial Letters are

TABLE OF THE DOMINICAL LETTERS FOR 4000 YEARS AFTER CHRIST ACCORDING TO THE NEW STYLE OF THE CALENDAR.

YEARS UNDER ONE HUNDRED.				HUNDREDS OF YEARS AFTER CHRIST.			
				100	200	300	400
				500	600	700	800
				900	1000	1100	1200
				1300	1400	1500	1600
				1700	1800	1900	2000
				2100	2200	2300	2400
				2500	2600	2700	2800
				2900	3000	3100	3200
				3300	3400	3500	3600
				3700	3800	3900	4000
				C	E	G	B A
1	29	57	85	B	D	F	G
2	30	58	86	A	C	E	F
3	31	59	87	G	B	D	E
4	32	60	88	F E	A G	C B	D C
5	33	61	89	D	F	A	B
6	34	62	90	C	E	G	A
7	35	63	91	B	D	F	G
8	36	64	92	A G	C B	E D	F E
9	37	65	93	F	A	C	D
10	33	66	94	E	G	B	C
11	39	67	95	D	F	A	B
12	40	68	96	C B	E D	G F	A G
13	41	69	97	A	C	E	F
14	42	70	98	G	B	D	E
15	43	71	99	F	A	C	D
16	44	72		E D	G F	B A	C B
17	45	73		C	E	G	A
18	46	74		B	D	F	G
19	47	75		A	C	E	F
20	48	76		G F	B A	D C	E D
21	49	77		E	G	B	C
22	50	78		D	F	A	B
23	51	79		C	E	G	A
24	52	80		B A	D C	F E	G F
25	53	81		G	B	D	E
26	54	82		F	A	C	D
27	55	83		E	G	B	C
28	56	84		D C	F E	A G	B A

exhausted, and that they will return in the same order in every four hundred years.

Now it deserves to be noted that the Table, when thus arranged, makes C to be the Dominical Letter for 1582; so that the two changes, viz., the omission of ten days in the sixteenth century and the suppression of three letters in every four hundred years, without regard to that omission, conspire in producing one and the same result. This is as it should be; for the two changes looked to the same object, the only difference being that the one corrected an error, against the repetition of which the other was designed to guard. The cancelling of the ten days in 1582 merely shows what the Dominical Letter would have been in 1582 if the intention of the original authors of the Calendar had been realized; the reformed Table simply shows how that intention is to be realized, and how it might have been realized continuously from the beginning of the Christian era. Hence the two changes, though in a certain true sense independent of one another, converge to the same result, and thus mutually confirm one another.

It is strangely asserted in the Encyclopædia Britannica (see seventh edition, on the word "Calendar") that "In "the reformed Calendar the intercalary period is four hun- "dred years, which number, being multiplied by seven, "gives two thousand eight hundred years as the interval in "which the coincidence is restored between the days of the "year and the days of the week. This long period, how- "ever, may be reduced to four hundred years," etc. But while the letters move at the same intervals, how is it possible that the diminution of their number should retard their return? Besides, an inspection of the Table for the Dominical Letters according to the New Style will show that in the years from 1 to 99 inclusive in every century,

the Letters follow the law of the Solar Cycle and repeat
themselves once in every twenty-eight years ; and thus
restore in the same interval the coincidence between the
days of the week and the days of the year.   The truth is
that in the New Style as well as the Old, the coincidence
of the day of the week and the day of the year is restored
once in twenty-eight years, and that the suppression of the
letters in the centurial years affects only the revolution of
the Centurial Letters, and serves to accelerate and not to
retard their return.   In the Old Style every *secular* year
had two letters, while in the New Style three out of every
four *secular* years have but one letter each.   The suppres-
sion is limited to the *secular* years, and does not include
the years between the centuries.   Now the whole number
of letters is seven, and the suppression of three in four
hundred years is equivalent to the withdrawal of three
letters from the series.   The revolution, therefore, of the
letters in the *secular* years will be in the ratio of 7 to 4 ;
and as the whole series will revolve one hundred times in
seven hundred years, so the four will revolve the same
number of times in four hundred years.   The seven letters
revolved four times in twenty-eight years, and consequently
an integral number of times in every multiple of 28, and
the first secular year which is a multiple of 28 is 700 ; the
four letters revolve four times in sixteen years, and conse-
quently an integral number of times in every multiple of
16, and the first secular year which is a multiple of 16 is
400.   In the one case we have $7 \times 4 \times 25 = 700$; and in
the other we have $4 \times 4 \times 25 = 400$.   This statement
shows the reason for the different arrangement of the hun-
dreds in the two tables of the Old and New Styles ; and it
shows also that in both styles the letters return and restore
the coincidence between the days of the week and the days

of the year once in twenty-eight years ; and that the only difference is that the Centurial Letters revolve more slowly in the one case than in the other.

Of course the Centurial Letters will revolve only once in four hundred years ; but this, for the reason above given, is so far from retarding, that it accelerates the revolution of the Cycle, causing its letters to revolve in the New Style once in twenty-four years, and not once in twenty-eight years, as in the Old Style. This will appear from an inspection of the table of Mr. Rivet, given in Wheatly ; in which it will be observed that only the leap-years are expressed, and that the years 1700, 1800, 1900, are not expressed, but are understood, like the other common years, to take each one letter only, counting from the leap-year next preceding. The Table begins with the first leap-year after the reformation.

	A. G. F. E. D.	C. B. A. G. F.	E. D. C. B. A.	G. F. E. D. C.	B. A. G. F. E.	D. C. B. A. G.	F. E. D. C. B.
	1584	88	92	96	....	....	....
0	.... 1612 40 68 96	16 44 72	20 48 76	24 52 80	1600 28 56 84	4 32 60 88	8 36 64 92 ....
1	1708 36 64 92	12 40 68 96	16 44 72	20 48 76	24 52 80	28 56 84	1704 32 60 88 ....
2	1804 32 60 88	8 36 64 92	12 40 68 96	16 44 72	20 48 76	24 52 80	28 56 84 ....
3	.... 28 56 84	1904 32 60 88	8 36 64 92	12 40 68 96	16 44 72	20 48 76	24 52 80 ....
	....	....	....	....	2000	4	8

In the Old Style of the Calendar, as before remarked, the order of the letters in the Solar Cycle suffered no

change, and was of perpetual use. The letters as given, page 42, stand thus :

1	G F	5	B A	9	D C	13	F E	17	A G	21	C B	25	E D
2	E	6	G	10	B	14	D	18	F	22	A	26	C
3	D	7	F	11	A	15	C	19	E	23	G	27	B
4	C	8	E	12	G	16	B	20	D	24	F	28	A

And whatever be the year of the Christian era, we have only to add to it 9 and divide the sum by 28, and opposite to the remainder, or, if there be no remainder, opposite to 28, we find the Dominical Letter for the year according to the Old Style.

In the New Style, however, the removal in every one of three out of four centuries of a Centurial Letter renders it impossible to construct a Table of this sort for perpetual use. The nearest approach to it is a Table which may be used for particular centuries. The following Table was suited to the last century, i. e., from 1700 to 1799 inclusive :

1	D C	5	F E	9	A G	13	C B	17	E D	21	G F	25	B A
2	B	6	G	10	F	14	A	18	C	22	E	26	G
3	A	7	C	11	E	15	G	19	B	23	D	27	F
4	G	8	B	12	D	16	F	20	A	24	C	28	E

The following Table is suited to the present century, i. e., from 1800 to 1899 inclusive :

1	E D	5	G F	9	B A	13	D C	17	F E	21	A G	25	C B
2	C	6	E	10	G	14	B	18	D	22	F	26	A
3	B	7	D	11	F	15	A	19	C	23	E	27	G
4	A	8	C	12	E	16	G	20	B	24	D	28	F

And the following Table will be suited to the next century, that is, from 1900 to 1999 inclusive :

1	F E	5	A G	9	C B	13	E D	17	G F	21	B A	25	D C
2	D	6	F	10	A	14	C	18	E	22	G	26	B
3	C	7	E	11	G	15	B	19	D	23	F	27	A
4	B	8	D	12	F	16	A	20	C	24	E	28	G

These Tables are to be used in their respective centuries, exactly as the corresponding Table for the Old Style is used for any and every century of the Old Style ; i. e., you add 9 to the given year, divide the sum by 28, and opposite to the remainder, if there be a remainder, or if not, opposite to 28, in the Table proper for the century, you find the Dominical Letter or Letters which belongs to the given year. Some anomalies, however, such as never occur in the Old Style, are unavoidable. In the first Table, for example, or that from 1700 to 1799, in order to provide two letters for the leap-years 1728, 1756, and 1784, we are obliged to assign two letters to the year 1700, which, being a common year under the New Style, has but one letter. A similar remark is applicable to the Table from 1800 to 1899, and to that from 1900 to 1999.

The above method, however, of finding the Dominical Letter under the New Style is cumbersome, and has given place to others more expeditious ; the best of which is that of the English and American Calendar given in " A Table " to find Easter from the present time to the year 1899 " inclusive ; " which is as follows :

" To find the Dominical or Sunday Letter, according to " the Calendar, until the year 1899, inclusive,

" add to the year of our Lord its fourth part, " omitting fractions, divide the sum by 7, and " if there be no remainder, then A is the Sunday " Letter ; but if any number remain, then the " letter standing against that number in the " small annexed Table is the Sunday Letter.

0	A
1	G
2	F
3	E
4	D
5	C
6	B

" Note, that in all bissextile or leap-years, the letter " found as above will be the Sunday Letter from the inter- " calated day exclusive, to the end of the year."

In this form the rule is applicable only to the present

11

century, and will not again be applicable before the year 2700; but in the first of our " General Tables," the rule is given in such form as to make it applicable to any century:

General Table for finding the Dominical or Sunday Letter according to the New Style of the Calendar.

6	5	4	3	2	1	0
B	C	D	E	F	G	A
				1600	1700	1800
1900 2000	2100	2200	2300 2400	2500	2600	2700 2800
2900	3000	3100 3200	3300	3400	3500 3600	3700
3800	3900 4000	4100	4200	4300 4400	4500	4600
4700 4800	4900	5000	5100 5200	5300	5400	5500 5600
5700	5800	5900 6000	6100	6200	6300 6400	6500
6600	6700 6800	6900	7000	7100 7200	7300	7400
7500 7600	7700	7800	7900 8000	8100	8200	8300 8400
8500	&c.					

To find the Dominical or Sunday Letter for any given year of our Lord, add to the year its fourth part, omitting fractions, and also the number, which, in Table I, standeth at the top of the column wherein the number of hundreds contained in that given year is found: Divide the sum by 7. and if there be no remainder, then A is the Sunday Letter; but if any number remain, then the Letter which standeth under that number at the top of the Table is the Sunday Letter.

The General Rule contains the following directions:

1. To add to the year its fourth part, omitting fractions.

2. To add to the sum thus obtained a number which, for certain centuries, varies from 1 to 6, both inclusive.

3. To divide the entire sum thus obtained by seven.

These directions may be best explained in a reverse order. To begin, then, with the last:

The number of years is supposed to form an equi-different series, increasing by unity, from 1 to 8500. Now if we take any member of this series, which is a multiple of 7, and divide it and the members which follow it by 7, the remainders will repeat themselves in the following order, viz., 0, 1, 2, 3, 4, 5, 6; and as the Dominical Letters always repeat themselves in the order in which they are formed, viz., A, G, F, E, D, C, B, the ciphers which remain, after dividing the series by 7, are made to serve as indices to the letters; so that 0 always means A; 1, G; 2, F; 3, E; 4, D; 5, C; and 6, B. Whence it appears that the precise reason for dividing the sum by 7 is that we may obtain for the remainder such a number as shall be the index of the letter of which we are in search.

Hence also it appears that the reason for adding to the given year augmented by its fourth part one of the figures at the head of the Table, is that the remainders, after the division is performed, may, in all cases, be the true indices to the letters arranged in their normal order.

The reason for adding to the year its fourth part before dividing by 7, is that in every fourth year we are obliged to leap a letter and consequently its index; that is to say, we need to obtain an index which is two, instead of one, greater than that of the letter for the year next preceding. Now if we divide by 7 an arithmetical series growing by unity, the remainder after each division is only one greater than that which preceded it; but if we would make the remainder for every fourth year greater by two instead of one, we must add to every member of the series its fourth part; omitting fractions, because we are concerned only

with whole numbers, and are simply aiming to make every fourth dividend (and consequently its remainder) one more than that which was next before it. Take, for example, in a century under the column A, any four years of which the three first are common years and the fourth a bissextile; say 1869, 1870, 1871, and 1872. Add to the number of each year its fourth part, omitting fractions, and divide the sum by 7, and your remainders for the three first years are 5, 6, 0; which are the indices respectively for the letters C, B, A; while the fourth remainder is two, which is the index of F; showing that you have leaped the letter G and its index 1, and that the Dominical Letters for 1872 are G F · the former serving from the first of January to the inter͟alated day inclusive, and the latter for the rest of the year. We may take the four years from a century which is not in the column under A, only observing to add to the dividend, before dividing by 7, the figure which stands at the head of the column from which the century is taken.

The above rule may be simplified by rejecting the centuries. Thus: If the year belong to a bissextile century, reject the centuries and add to the remaining years their fourth part (omitting fractions) and divide the sum by 7; if there be no remainder, then A is the Sunday Letter; but the remainder, if there be one, will be the index of the Dominical Letter. If the year belong to a century which is one less than a bissextile century, then reject the centuries as before, and to the year which remains increased by its fourth part, add 1; if to a century which is two less, proceed as before and add 3; and if to a century which is three less, proceed as before and add 5 to the sum before dividing by 7; and the remainder in each case will indicate the letter as above.

EXAMPLES.

Required the Dominical Letter for 1649. Here the century is a bissextile; reject the centuries; and then dividing $\left(49 + \dfrac{49}{4}\right) = 61$ by 7, we have a remainder of 5; and C is the Dominical Letter.

Required the Dominical Letter for 1949. Here the century is one less than a bissextile; and therefore, rejecting the centuries, to the year 49 increased by its fourth part 12, we add 1 before dividing by 7; and $62 \div 7$ gives a remainder of 6, which shows that B is the Dominical Letter for 1949.

Required the Dominical Letter for 1871. The century being two less than a bissextile, we add 3 to the sum before dividing by 7; and $71 + \dfrac{71}{4} + 3 = 91$, which, being a multiple of 7, gives no remainder; showing that the Dominical Letter for 1871 is A.

Required the Dominical Letter for 1799. As the century is three less than a bissextile, we are to add 5 before dividing by 7. Rejecting the centuries, therefore, as before, we have $99 + \dfrac{99}{4} + 5 = 128$; and dividing 128 by 7, we have a remainder of 2, which shows that F is the letter required.

EXPLANATION.

The reason of this rule, so far as it differs from the above common rule, is to be found in the number and relative positions of the centurial letters in the reformed Calendar. These, counting two to the bissextile, are five in number, and repeat themselves in the same order every four hundred years; A being always the letter for a bissextile century; G for a century which is one less, E for a century which is

two less, and C for a century which is three less than a bissextile century. The letters of the three centuries which are counted as common years are thus seen to recede from the bissextile letter, 1 for the first century, viz., from A to G ; 3 for the second century, viz., from A to E ; and 5 for the remaining century, viz., from A to C, the letters being taken in retrograde order ; and hence in these centuries respectively (having rejected the centuries) we add one, three, or five to the sum of the remaining years augmented by its fourth part ; in order that this sum, divided by 7, may give the remainder, which in the normal arrangement of the letters represents the letter which is sought.

N. B.—When A (as above) is said to be the letter for a bissextile year, it is always understood to denote the letter which is used from the intercalary day to the end of the year ; the letter next before it, in retrograde order, being that which is used from January 1st to February 24th.

CHAPTER XV.

ONE thing more remains to be more particularly con-
sidered before we can enter intelligently on a review
of the Tables in the Prayer Book Calendar; and that is,
the PASCHAL TERM.

The function of the Paschal Term is to help us in find-
ing Easter. It consists of but one day, though the day on
which it falls varies in different years. It was used under
the Old Style as it is under the New; and under both on
the same days of the month; the cancelling of the ten
nominal days at the time of the reformation having had no
other effect on the Paschal Terms than to restore them to
their original conformity with astronomical truth.

The moon or lunar month in which Easter falls is called
the Paschal Moon, and sometimes the month Nisan. It
does not coincide with any solar or civil month, but com-
prises a part of the month of March and a part of the
month of April; never beginning earlier than the 8th day
of March, nor later than the 5th day of April.

The Calendar, after the example of the ancient Hebrews,
reckons the age of the moon from its *phasis* or first appear-
ance; and is hence led to divide the synodical month into
unequal parts of fourteen and sixteen days; from new to
full being fourteen, and from full to new sixteen, the *inter-*

lunium, or time of the non-appearance, being thrown into the latter part. Hence it is that we reckon from March 8th to March 21st, being fourteen days inclusive, for the full moon ; but from March 21st to April 5th, sixteen days inclusive, for the utmost limit.

When the Paschal Moon begins on the 8th of March, it is full on the 21st of March ; from the 8th to the 21st of March, both inclusive, being fourteen days. When the Paschal Moon begins on the 5th of April, it is full on the 18th of April, because from the 5th of April to the 18th of April, both inclusive, are fourteen days. Hence as March 8th is the earliest day and April 5th is the latest day on which the Paschal Moon can begin, so the 21st day of March is the earliest day and the 18th of April is the latest day on which the Paschal Moon can be full.

Now the Paschal Term is that day of the solar year on which is the full moon next before Easter ; or as the moon is full on its fourteenth day, the Paschal Term may be defined to be the day of the solar year which coincides with the fourteenth day of the Paschal Moon.

The interval from the 8th of March to the 5th of April comprises twenty-nine days ; on any one of these days the Paschal Moon may begin ; and the addition of thirteen to the day of the solar year on which the Paschal Moon begins, gives us the day on which it is full ; and this day is the Paschal Term for that year. So that the Paschal Term may be any one of twenty-nine days. But although the Paschal Term may be any one of the twenty-nine days which intervene between the 21st of March and the 18th of April, both inclusive, yet Easter day has a somewhat wider range ; and that because Easter depends on the day of the week as well as on the day of the month. For the Sunday next after the Paschal Term may perchance be one

day after it, or it may be six days after it. If the Paschal
Term happens to be March 21st, and that day happens to
be Saturday, then Easter day is the 22d of March. But if
the Paschal Term happens to be April 18th, and that day
happens to be Sunday, then Easter day is the Sunday fol-
lowing, viz., April 25th. So that although the Paschal
Term must fall on some one of twenty-nine, yet Easter may
be any one of thirty-five different days ; the earliest possible
Easter being March 22d, and the latest possible being April
25th, and that not for this century only but for all time.

To find Easter for a given year by the reformed Lunar
Calendar, as already explained, we enter the Calendar with
the Epact for the year ; and the first day parallel to it
after the 8th of March, inclusive, is the day of the Paschal
New Moon ; to which add 13 and you have the Paschal
Term ; and the first day after it which has the Dominical
Letter for the year is Easter day.

The way of finding the Epact for the year by the Ex-
panded Table of Epacts has been already explained. Short
schedules adjusting the Epacts to the Golden Numbers for
particular centuries have also been given. The correspon-
dence of the Golden Numbers and the Epacts for the time
of two cycles of the moon is continually exhibited in our
Prayer Book. But as the Epacts for the year grow by 11,
we may always find the Epact for the year without the use
of the above ways, by multiplying the Epact of the Golden
Number of the previous year by 11, and dividing by 30,
when the remainder will be the Epact for the current year.
For Example, the Epact of 1870, the Golden Number of
which is IX, is $\left(\dfrac{8 \times 11}{30} = 2 + 28\right)$ twenty-eight, or the
number which remains after dividing the product of 8 and
11 by 30. So that taking N for the Golden Number for

the year, we have the following formula in which the Epact for the year is equal to R ; viz., $11 \dfrac{(N - 1)}{30} = q + R$.

As the same line of Epacts continues to be used for at least one hundred, and it may be for three hundred years together, it may be presumed to be known for all ordinary purposes ; and for other purposes it may always be learned by reference to the Table, pp. 132, 133. In fact, therefore, all that is commonly needed besides the Dominical Letter in order to find Easter for a given year, is to know the year of the Lunar Cycle which is coincident with the given year ; in other words, the Golden Number for the said year—the rule for finding which is given in our Prayer Book Calendar, and has been already explained in the present treatise. These Numbers, which are the same under both Styles, are digested in the following Table for four thousand years after the Christian epoch. The centuries are placed on the left and the years from 0 to 99 at the top ; the Golden Numbers being found at the points where the lines from the left and the top intersect each other. Thus to find the Golden Number for 1870, look for 1800 on the left of the Table and for 70 at the top ; and where the line from the side meets that from the top you find 9 ; which is the Golden Number for 1870. (See page 171.)

As Easter always falls on one of the thirty-five days after the 21st of March, it is evident that there must be for every one of these days a certain number which shows the difference between March 21st and Easter day, or the **num-ber** of days which intervene between them. This number is called The Number of Direction ; because being added to the 21st of March it brings us to Easter day. In the following Table the Number of Direction for every year of the Lunar Cycle is placed in the angle that is formed by

TABLE SHOWING THE GOLDEN NUMBER FROM THE BEGINNING OF THE CHRISTIAN ERA TO A. D. 4000.

YEARS LESS THAN A HUNDRED.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
95	96	97	98	99														

HUNDREDS OF YEARS.

			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	1900	3800	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
100	2000	3900	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5
200	2100	4000	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10
300	2200		16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
400	2300		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1
500	2400		7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6
600	2500		12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11
700	2600		17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
800	2700		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2
900	2800		8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7
1000	2900		13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12
1100	3000		18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1200	3100		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3
1300	3200		9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8
1400	3300		14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13
1500	3400		19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1600	3500		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4
1700	3600		10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9
1800	3700		15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14

the vertical column from the line of the Golden Numbers at the head of the Table, and by the horizontal line from the column of the Dominical Letters at the side. So that with the Golden Number and Dominical Letter for the year we can easily find the Number of Direction; which, added to the 21st of March, directs us to the day on which Easter falls in that year. For example: the Golden Number for 1870 is IX and the Dominical Letter is B; and under IX and parallel with B you find 27, which is the Number of Direction for the year; and which, added to March 21st, brings us to April 17th, which is Easter day for 1870. (See page 175.)

The Table here referred to is compiled from the Expanded Table of Epacts and the reformed Lunar Calendar. Take, for example, the first column; or that under the Golden Number I, the Epact for which in the present century is *. This symbol in the Lunar Calendar is set opposite to the 31st of March, which brings the Paschal Term to April 13. Consequently the earliest day on which Easter can fall in years corresponding to the Golden Number One, is April 14th, the letter of which is F; and as from March 21st to April 14th are twenty-four days, 24 is set opposite to F, 25 to G, 26 to A, etc.; showing that in years corresponding to the Golden Number I, Easter day is that day, from April 14th to April 20th, the letter for which is the Dominical Letter for the year. The rest of the Table is formed in like manner.

Or you may proceed thus: Find the numbers for the first year of the cycle, and set them down as above directed. Then from the least of the numbers so found deduct 11, or if the number be less than 11 add 19, and you will have the least number for the next year of the cycle. Set this number opposite to the Dominical Letter for the year which

is always either the fourth or third from the Letter opposite to which stands the least number for the year of the previous Cycle ; the fourth downward after deducting 11, and the third upward after adding 19, and making all the counts inclusive.

This Table has been in use since 1752, when the New Style of the Calendar was legalized in Great Britain, and is commonly given as " A Table to find Easter day according " to the New Style." The title, however, is too general, since, strictly speaking, it is a Table to find Easter day from 1700 to 1899. If applied to the next century it fails, in eleven instances, viz., in the years 1902, 1906, 1926, 1930, 1950, 1957, 1970, 1974, 1977, 1994, and 1997 ; in each instance giving Easter a week too early. For other years of the same century the Table holds good ; and the reason of its failing in the instances above mentioned is that in the next century the Epacts will be one less than in the present ; the Epact of the Golden Number I, for example, being not as now *, but 29 ; the consequence of which is that all those Easters which fall on the day next after the Paschal Term are a week later than they would be if the present adjustment of the Epacts to the Golden Numbers were continued.

The Table, page 176, gives the Number of Direction to find Easter day for any year from 1900 to 2199.

From what has been said, it appears that three points of time are to be considered in the Easter problem ; the one fixed and the two others variable. The fixed point is the day of the vernal equinox, March the 21st ; and of the two variable points, the first is the number of days varying from 1 to 28, which, added to March 21st, brings us to the Paschal Term ; and the second is the number which, added to the Paschal Term, brings us to Easter day, a number

which varies from 1 to 6. These two together constitute
the Number of Direction. The celebrated formula of the
German mathematician, M. Gauss, effects the same result
without direct reference to the Expanded Table of Epacts
and the Lunar Calendar. It is founded on an intimate
knowledge of the reformed Calendar, and aims by an ana-
lysis of the *data* (the *a, b, c,* of the formula), authorized
by the Calendar, to determine the variable quantities (the
d and *e* of the formula), the sum of which added to the
day next after the vernal equinox will give us Easter day
for the year. This is clearly shown in the following *ration-
ale* of the formula by my ingenious friend Mr. William
Moore, which I take much pleasure in laying before the
reader. The formula has been often published, but I am
not aware that it has been before explained. Nor in fact
has the formula itself, so far as I can find, ever before been
correctly given ; the first published copy, apparently that
of Delambre, having contained an error which has been
perpetuated in subsequent reprints. The New Edinburgh
Encyclopedia, article *Chronology*, pronounces the method
" infallible," but the learned author of the article could
hardly have tested the formula, as he has given it, by the
Easters from 1582 to the end of the seventeenth century.

THE NUMBER OF DIRECTION TO FIND EASTER DAY FROM 1700 TO 1899.

DOMINICAL LETTERS.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII.	XIX.	DOMINICAL LETTERS.
A	26	19	5	26	12	33	19	12	26	19	5	26	12	5	26	12	33	19	12	A
B	27	13	6	27	13	34	20	13	27	20	6	27	13	6	20	13	34	20	6	B
C	28	14	7	21	14	35	21	7	28	21	7	28	14	7	21	14	28	21	7	C
D	29	15	8	22	15	29	22	8	29	15	8	29	15	1	22	15	29	22	8	D
E	30	16	2	23	16	30	23	9	30	16	9	23	16	2	23	9	30	23	9	E
F	24	17	3	24	10	31	24	10	31	17	10	24	17	3	24	10	31	17	10	F
G	25	18	4	25	11	32	18	11	32	18	4	25	18	4	25	11	32	18	11	G
DOMINICAL LETTERS.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII.	XIX.	DOMINICAL LETTERS.

GOLDEN NUMBERS.

EXPLANATION.—Having the Golden Number for the year, and its Dominical Letter, you will find at their angle of intersection the number which added to March 21st gives you Easter day for that year.

THE NUMBER OF DIRECTION TO FIND EASTER DAY FROM 1900 TO 2199.

DOMINICAL LETTERS.	GOLDEN NUMBERS.																			DOMINICAL LETTERS.
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII.	XIX.	
A.........	26	19	5	26	12	33	19	12	33	19	5	26	19	5	26	12	33	19	12	A
B.........	27	20	6	27	13	34	20	13	27	20	6	27	13	6	27	13	34	20	13	B
C.........	28	14	7	28	14	35	21	14	28	21	7	28	14	7	21	14	28	21	7	C
D.........	29	15	8	22	15	29	22	8	29	22	8	29	15	8	22	15	29	22	8	D
E.........	30	16	9	23	16	30	23	9	30	16	9	30	16	2	23	16	30	23	9	E
F.........	31	17	3	24	17	31	24	10	31	17	10	24	17	3	24	10	31	24	10	F
G.........	25	18	4	25	11	32	25	11	32	18	11	25	18	4	25	11	32	18	11	G
DOMINICAL LETTERS.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII	XIX.	DOMINICAL LETTERS.

GOLDEN NUMBERS.

EXPLANATION.—Having the Golden Number for the year, and its Dominical Letter, you will find at their angle of intersection the number which, added to the 21st March, gives you Easter day for that year.

DEMONSTRATION

FORMULA OF GAUSS FOR FINDING EASTER,

IN A LETTER TO THE AUTHOR

BY WILLIAM MOORE, ESQUIRE.

My DEAR DR. SEABURY :

I avail myself with pleasure of the offer you kindly make me of a corner in your book for my demonstration of the formula of Gauss for finding Easter, as I think it may save some of your readers who, like myself, are reluctant to use a formula of which they do not know the rationale, much of that trouble which I myself found in puzzling out this beautiful but somewhat intricate formula. As I feel by no means sure, however, of being able to convey to other minds the clear idea of this matter which from much study of these subjects I have in my own, I leave this paper unreservedly at your discretion, either to give it a place in your forthcoming work, or to consign it quietly to the waste-basket. I have always had somewhat of the temper of those inquisitive children who pull to pieces an ingenious mechanical toy to find out "why it goes," and when a boy gave a practical illustration of this in taking apart the first watch I owned, to learn its interior mechanism. In this spirit, when, some twenty odd years ago, I first saw this formula of Gauss, without any demonstration, in a number of the True Catholic (that for August, 1849), I could not rest till I had analyzed it and found out the reason why it did what it professed to do. An additional motive of this investigation was the exception to the rule which, as given

in the article in the True Catholic, and as I have since seen in Delambre's Astronomy also, I saw at once was too sweeping, as it would, if applied as there directed, make it impossible for Easter ever to fall on the 25th April, as it may, and often does, and I wished to find some correct rule for the application of the exception. The formula, as you know, is as follows :

Divide the year   by 19 and call the remainder a.
Divide also   by 4 and call the remainder b.
Divide also   by 7 and call the remainder c.
Divide 19 a + M   by 30 and call the remainder d.
Divide 2 b + 4 c + 6 d + N by 7 and call the remainder e.

Easter will be (22 + d + e) of March, or (d + e — 9) of April.

This rule is general for the Julian Calendar, where M = 15 and N = 6, and are constant. For the Gregorian Calendar M and N require a correction, which may be found by the subjoined Table, which will suffice till the year 2500 :

	M.	N.
From 1582 till 1699	22	2
1700 " 1799	23	3
1800 " 1899	23	4
1900 " 1999	24	5
2000 " 2099	24	5
2100 " 2199	24	6
2200 " 2299	25	0
2300 " 2399	26	1
2400 " 2499	25	1

Exception.—If the calculation gives Easter 26th or 25th April, deduct seven days.

Now if we select a year which is divisible by 19 and by 28 without remainder, and consequently by the factors of 28, 4 and 7, we eliminate the quantities a, b and c, which each become 0, and shall more easily see what are the constants M and N. Take, for instance, the year 2128: a = 0 ; b = 0 ; c = 0 ; and, the constants for the century being

$M = 24$, $N = 6$, d becomes $\left(\dfrac{M}{30}\right)^{R} = 24$, and $e\left(\dfrac{6\,d + N}{7}\right)^{R} = 3$,

and Easter is $(22 + 24 + 3)$ of March, or, which is the same thing $(24 + 3 - 9)$, April $= 18$ April ; which we find correct by our tables, using that for 1900 to 2199, the Golden Number being I and the Sunday Letter C. We see that in this case a being 0, d becomes simply the constant $M = 24$. Now, bearing in mind the rule for finding the Golden Number, as given in our Prayer Book, it is manifest that a will always be one less than the Golden Number of the year, and in the above case a being 0, the Golden Number is I. Now, counting forward from 22d March 24 days $= M$, we arrive at the 15th day of April, the day after the Paschal full moon designated by the Golden Number I, which in the aforesaid Table stands against the 14th April ; so that the 15th April is the earliest day on which Easter can fall on the first year of the Lunar Cycle. The constant M is therefore the number of days counted forward from the 22d March to the day following the Paschal full moon of the year I of the Lunar Cycle.

Now since the Epacts increase each year by 11, if we count back eleven days from the Golden Number I, we come to the Golden Number II ; thence counting back eleven days, we come to the Golden Number III, and so on through the whole cycle of nineteen years. But it is the same thing whether we count back eleven days or count forward nineteen days, observing always to include in our count the lunar month of thirty days from 21st March to 19th April, inclusive. So that $\left(\dfrac{19\,a + M}{30}\right)^{R} = d$ carries us forward from 22d March to the day following the Paschal full moon of the given year, which is the earliest day on which Easter can fall on years having that same Golden Number, the rest being dependent on the Sunday Letter.

The remainder of the formula for 2128 we found to be $\left(\dfrac{6\,d + N}{7}\right)^{R} = 3$. Now if we take some year which is

divisible by 28, and where in addition d comes out any multiple of 7, we shall be better able to see what N is, and then learn the effect of 6d in this formula. Take for this purpose the year 1848 ; the Golden Number of which is VI, and the Sunday Letter A, as of all the years in that century divisible without remainder by 28. The constants are 23 and 4.

For that year, therefore,

$$a = 5 \; ; \; b = 0 \; ; \; c = 0 \; ; \; d = \left(\frac{5 \times 19 + 23}{30}\right)^{\text{R}} = 28.$$

Now d = 28, being divisible without remainder by 7, e is reduced simply to the constant N = 4, and Easter is (22 + 28 + 4) March, or 23d April.

Bearing in mind now that the year is one divisible by 28 without remainder, N is shown to be the number counted from the Sunday Letter D, from which we began to count at 22d March, and at which, consequently, any number of even weeks must end, to the Sunday Letter of those years in any given century which are divisible without remainder by 28. But since d is not always a number of even weeks, and does not consequently always terminate on Sunday Letter D, and since N must begin to count from the Sunday Letter D, something must be included in the value of e which will supplement the value of d and make with it a number of even weeks ; and this is done by including 6d in the composition of e, which with d we had before = 7d or d weeks ; the final division by 7 throwing out any surplus weeks and leaving a remainder less than one week. In fact, practically, in using this formula instead of 6d, I simply add in the composition of e a number which with d makes an even multiple of 7, which might be expressed thus (7 n — d), n being any number that makes the expression positive.

So far as we have yet gone, we could only find Easter from our formula for those years which are divisible by 4 and by 7 without any remainder. Let us now examine the effect of b and c, where the division by 4 and 7 leave

remainders. Beginning with a year in which both are 0, we have the series of remainders as follows, viz. :

		B.				B.				B.					B.	
b	$= 0$	1	2	3	0	1	2	3	0	1	2	3	0, etc.
c	$= 0$	1	2	3	4	5	6	0	1	2	3	4	5, etc.
$(2\,b+4\,c)$	$= 0$	6	12	18	16	22	28	6	4	10	16	22	20, and
$\left(\dfrac{2\,b+4\,c}{7}\right)^{\mathrm{R}}$	$= 0$	6	5	4	2	1	0	6	4	3	2	1	6.

Now we see that the remainders after the division by 7 diminish regularly by 1 till we come to 0 in the column B, which are bissextile years when they diminish by 2. No interruption in this regular series of remainders occurs when c becomes 0, because the amount dropped is only an even number of sevens. If, therefore, we begin with the Sunday Letter of any year divisible by 28, we get those of the remaining years of the Cycle in reverse order, passing over one letter in ordinary and two in bissextile years, as it should be. Suppose the first letter to be A, six brings us to G ; five to F ; four to E ; the next year is bissextile, and two brings us to C, and so on. The remainders, therefore, of (2 b + 4 c) divided by 7 bring us from the Sunday Letter of the years divisible by 28 without remainder, to that of the given year, whatever may be its place in the Cycle.

The first part of the formula $\left(\dfrac{19\,a\,+\,M}{30}\right)^{\mathrm{R}} = d$ is controlled by the Golden Number, or the place of the year in the Lunar Cycle of nineteen years, and brings us to the earliest day on which Easter can happen on years having that Golden Number.

The second part of the formula $\dfrac{2\,b + 4\,c + 6\,d + N}{7}$ is governed by the Sunday Letter of the year, or its place in the Solar Cycle of twenty-eight years ; the remainder after the division by seven of six d, makes with the d we had before even weeks, and brings us to the Sunday Letter

D, from which we begin to count. Standing, as it does, against 22d March, N conducts thence to the Sunday Letter of the years in the given century which are divisible by 28 without remainder, and then the remainder, after division of $\dfrac{2\,b + 4\,c}{7}$, brings us to the Sunday Letter of the given year, which is Easter day.

This rule is subject to some exceptions, but, as I have already remarked, the rule given for these exceptional cases is much too broadly stated in the works named in the former part of this letter. This irregularity in the result given by the formula is owing to the double Epacts xxiv and xxv opposite the 5th April in the Roman Calendar which mark the new moons, to which our Golden Numbers which point to the full moons were made to conform, and which, in some centuries, cause them to be crowded on the 17th and 18th April, when, if the lunation was a full one of thirty days, they would have stood opposite to the 18th and 19th. This only occurs in those centuries in which the series of Epacts in use embraces both those Epacts xxiv and xxv.

The rule for the application of the exceptions may be thus given :

1st. When the formula gives d + e = 35, and Easter consequently 26th April, seven days must be deducted, and Easter will fall on the 19th April. This case can only occur when the Epact is xxiv and the Sunday Letter D, and in the next three centuries will only occur three times, viz., on 1981, 2076, and 2133.

2d. When the formula gives (d + e) = 34, and consequently Easter 25th April, the exception does not apply universally, and the rule for its application cannot be so simply stated. The following rule will, however, suffice for more than two thousand six hundred years.

If the given year in this case is

between 1900 and 2199, $\left.\begin{array}{l} \\ \text{or}\quad 3100 \text{ and } 3399, \\ \text{or}\quad 3800 \text{ and } 4099, \end{array}\right\}$ and *a* greater than 10,

deduct seven days and Easter will fall on the 18th April.
If both the above conditions are not fulfilled, the formula
gives the correct result 25th April. In the present century
there is but one year in which the formula gives Easter
25th April, viz., 1886: a is 5, and neither of the conditions
being fulfilled, the result is correct. During the next three
hundred years, being the first of the above named periods
from 1900 to 2199, there are six years in which the formula
gives Easter 25th April; in three of which the result is
correct, a being 5. The years are 1943, 2038, and 2190.
In the other three years a is 16, and being greater than
10, both conditions are complied with, and the exception
applies. These years are 1954, 2049, and 2106. In the
second of the above named periods, viz., that from 3100 to
3399, there are also six cases in which the formula gives
Easter 25th April, in three of which the result is correct,
a being 0, viz., 3154, 3249, and 3306. In the other three
the exception applies, viz., in 3165, 3260, and 3317, a being
11, and both conditions fulfilled. During the last of the
above named periods, that from 3800 to 4099, only three
cases occur in which the formula gives 25th April, and as
in each $a = 14$, the exception applies; the years are 3852,
3909, and 4004.

After 4099 there is an interval of four hundred years,
during which the exception will not apply; so that so far
from the exception being universal when the formula gives
25 April, as stated by Delambre, it only applies in nine
instances in the long period of more than two thousand
nine hundred years from the Gregorian reformation in 1582
to 4499.

At the risk of making this letter unreasonably long, I
will now venture to make a few remarks on the constants
M and N, which, as they have no direct bearing on the
demonstration of the formula, I have postponed till now,
in order not to interrupt unnecessarily the thread of my
argument.

M has been shown to be the distance counted from 22d
March to the day following the Paschal full moon in the

first year of the Lunar Cycle. In the Nicene Calendar, the Golden Number I, which marks the new moon of that year, stands against the 23d March, and the Paschal full moon falls consequently on the 5th April, the day after which, or earliest Easter, is the fifteenth day counted from 22d March. M, therefore, in that Calendar still used by the Eastern Church, is = 15, and is constant, because there is no provision in that Calendar as there is in the reformed Calendar for the gradual shifting forward of the Golden Numbers. The change in the place of the Golden Numbers at the time of the Gregorian reformation of the Calendar was rendered necessary by the difference between nineteen tropical years and two hundred and thirty-five lunations, which, in the Nicene Calendar, are assumed to be equal. This difference, which, in one lunar cycle of nineteen years, amounts to two hours and three and a half minutes, had accumulated in the one thousand two hundred and fifty-seven years that had elapsed since the time of the Council of Nice to something over five and two-thirds days. The actual advance made was seven days, the new moon of that year, which was the sixth year of the Lunar Cycle, which would by the old Calendar have fallen on the 28th March, being made in the new to fall on the 4th April; the reason for which may have been to make the Golden Number I and the Epact i coincide in that first year of the new Calendar, or they may have found that a new moon actually occurred on the 4th April of that year.* M may be found for the Gregorian Calendar for any century by adding to 22 the number found opposite to that century in column 3 of Table II of the General Tables in our Prayer Book, deducting 30 if it exceeds that sum.

We found N to be the distance counted from D to the Sunday Letter of those years in any given century which are divisible by 28 without any remainder. In the Nicene Calendar it is 6, because in that Calendar the Sunday Letters recur regularly after twenty-eight years without any interruption, and the Sunday Letter of all years divisible by 28 without remainder is C, which is the sixth, counting

---

* See note at the end, page 222.

down from D. In the Gregorian Calendar the regular succession of Sunday Letters is interrupted on the recurrence of those centurial years which are not bissextile, and N consequently runs through a series of changes from 0 to 6. It may be found for any century for the Gregorian Calendar by adding 6 to the difference between the Old and New Style and dividing by 7. Take this century, for instance; the difference between Old and New Style is now 12, and $\dfrac{6 + 12}{7}$ remainder is 4, which is N for this century. Or it may be found thus: Seek in Table I of the General Tables in our Prayer Book the century for which it is required, and at the head of the column you find the Sunday Letter of those years in that century which are divisible by 28 without remainder. N will be the distance counted forward from D to that letter. By applying either of these rules for finding N for 1582 to 1699, you will find it was 2 and not 3, as given in Delambre and in the True Catholic. I have given it correctly in the Table in this paper.

And now, with sincere apology for taking up so much of your valuable space if you decide to give this to the public,

<div style="text-align:center">I remain, Rev. and very dear Sir,</div>

<div style="text-align:center">Your obedient servant,</div>

<div style="text-align:right">WILLIAM MOORE.</div>

WOODLAWN, *October*, 1871.

Mr. Moore has also called my attention to a fact which puts in a striking light the beauty and utility of Gauss's formula; and that is, the facility which it affords for calculating any number of consecutive Easters for one or more lunar cycles, or, if need be, for a century. For, when the Easter for the first year of a cycle is calculated by the formula, the other elements follow in such regular sequence that they can be written down without calculation. In the following Table, for example, containing the Cycle which has just been added to our Prayer Book, the calculation of the several Easters, after the first is determined, becomes,

by Mr. Moore's application of the Gaussian method, the work of only a few minutes:

YEAR.	Golden Number.	Sunday Letter.	d of Gauss.	$r\ n-d.$	$\left(\dfrac{2\,b+4\,c+N}{7}\right)^{R}\ r$	e of Gauss.	$(d+e-9)$ or $22+d+e.$ EASTER.
1881	I	B	23	5	5	3	17 April.
1882	II	A	12	2	4	6	9 "
1883	III	G	1	6	3	2	25 March.
1884	IV	F E	20	1	1	2	13 April.
1885	V	D	9	5	0	5	5 "
1836	VI	C	28	0	6	6	25 "
1887	VII	B	17	4	5	2	10 "
1888	VIII	A G	6	1	3	4	1 "
1889	IX	F	25	3	2	5	21 "
1890	X	E	14	0	1	1	6 "
1891	XI	D	3	4	0	4	29 March.
1892	XII	C B	22	6	5	4	17 April.
1893	XIII	A	11	3	4	0	2 "
1894	XIV	G	0	0	3	3	25 March.
1895	XV	F	19	2	2	4	14 April.
1896	XVI	E D	8	6	0	6	5 "
1897	XVII	C	27	1	6	0	18 "
1898	XVIII	B	16	5	5	3	10 "
1899	XIX	A	5	2	4	6	2 "

The three first columns need no remark. The fourth is d of Gauss, commencing the series with the constant M, and continued by adding 19 or deducting 11. The fifth column makes with d the next higher multiple of 7. The sixth column is $\left(\dfrac{2\,b+4\,c+N}{7}\right)^{R}$, calculated for one year and deduced for the others by deducting one for common and two for leap-years. These two columns added together (and deducting 7 when they equal or exceed that amount) become e of Gauss's method and form the seventh column; and $d+e$ added to March 22d brings us to Easter day, as given in the last column.

CHAPTER XVI.

Reasons for the reformation of the Calendar in Great Britain—The reform inaugurated by the 24th of George the Second—Preamble to the Act—Analysis of the Act—Appendix to the Act—Rejection of the Lunar Calendar—Adherence to the use of the Golden Numbers for finding Easter.

THE New Style of the Calendar, having been inaugurated by Gregory XIII, A. D. 1582, was at once adopted in Spain, Portugal, and part of Italy, in which countries ten nominal days were deducted from the Calendar, by calling what, according to the Old Style of the Calendar, had been the 5th of October, the 15th of October, 1582. In France the same change was made in the same year by order of Henry the Third, when it was decreed that the day which had been the 10th of December should be held and accounted to be the 20th of December, 1582. In Holland, Brabant, and Flanders, it was decreed that the 15th of December, 1582, should be accounted the 25th of December, 1582, and be celebrated as Christmas day. In Lorraine the 10th of December, 1582, of the Old Style, was taken to be the 20th of December, 1582. In Germany, Denmark, Poland and Hungary, the Gregorian Calendar was adopted in the years respectively of 1582, 1586, and 1587, and in Germany also by the subjects of the Roman obedience in 1584. In Germany, however, the Protestant part of the Empire adhered to the Old Style of the Calendar until 1699, when they adopted a new Calendar, that of Weigel, which differed from the Gregorian Calendar; determining Easter and the moveable feasts by astronomical science and not by the cycles. The Calendar of Weigel was

at the same time ordered to be used in Denmark; since which time the Style of Denmark agrees with that of the Protestants of Germany; the difference, however, of Weigel's Calendar from the Gregorian leading in some years to the observance of Easter on a different day.

In this state of things in the year 1751, or about one hundred and seventy years after the reform had been effected by the Church of Rome, and after all the nations of Europe except Sweden and Russia (Sweden followed in 1753) had preceded her, the Parliament of Great Britain adopted the same reform. The reform, indeed, had become a measure of necessity, so cogent were the reasons—social, commercial, and ecclesiastical—which demanded it. Great confusion had for a long time prevailed as to the beginning of the year; the people being divided between the use of the historical year which began on the 1st of January and the civil ecclesiastical and legal year, the beginning of which had for more than four hundred years been assigned to the 25th of March. The same events, if they happened between the 1st of January and the 25th of March, were assigned by some writers to one year and by others to the year following; both being equally correct, the one referring to the historical, and the other to the civil or legal year which was used in the execution of conveyances and all public instruments. Hence it became, and still is, customary, for the sake of precision, to annex the historical year to the legal year. "Bentley," says Bishop Monk, in his very entertaining and instructive life of the great critic, "was born on the 27th of January, 1661–62," * or $\frac{61}{62}$;

---

* An example will illustrate this distinction, an inattention to which has been a fruitful source of error. The doctrine of the Sacrifice of the Mass was decreed by the Council of Trent at its twenty-second session on the 17th of September, 1562 (Brent's Father Paul, p. 572); and the

where the first date denotes the civil or legal year, and the date annexed, 1662, denotes the historical year. Imagine, too, the perplexities and embarrassments occasioned to merchants and others having constant business in foreign countries by following a standard of time eleven days different from that of their correspondents ! In a commercial country difficulties of this sort had probably more to do in bringing about the reform than perplexities in regard to the celebration of Easter, partly perhaps because they fell upon those who had less patience to bear them.

The act by which the use of the reformed Calendar was received and established in Great Britain and her dependencies was passed in the 24th year of George the Second, A. D. 1751. In Pickering's " Statutes at Large," it forms the 23d chapter of that year, and is contained in volume 20th, pages 186–211. The Preamble, which discloses the motives of the Legislature and the reasons which rendered the reform necessary, is as follows : " Whereas the legal " supputation of the year of our Lord in that part of Great

Thirty-nine Articles of the Church of England were agreed upon and subscribed by the Archbishops and Bishops of the Provinces of Canterbury and York in Convocation on the 29th of January, 1562. A superficial comparison of the dates gives a plausible air to the suggestion that was astutely thrown out some thirty years ago, and has since been frequently repeated, that the XXVIIIth Article was not intended as a protest against the Trent decree, but was levelled at certain crude and unauthorized opinions current in that age. But the facts are that the Council of Trent followed the computation which then prevailed in Italy, and was afterwards made obligatory by the reformed Calendar, according to which the year began on the 1st of January; while the Articles bear on their face that they were adopted in January, 1562— " Secundum computationem Ecclesiæ *Anglicanæ*" (Sparrow's Collection, page 207)—and it is certain that according to the computation of the *Anglican* Church, the year then began on March the 25th, and that consequently the Articles were adopted in the January *following* the September in which the Tridentine doctrine was defined. The proper date is January 29th, 1562–63 ; that is, January 29th, 1563, according to the computation now in use.

" Britain called England, according to which the year
" beginneth on the 25th day of March, hath been found by
" experience to be attended with divers inconveniences, not
" only as it differs from the usage of neighbouring nations,
" but also from Scotland, and from the common usage
" throughout the whole kingdom, and thereby frequent
" mistakes are occasioned in the dates of deeds, and other
" writings, and disputes arise therefrom ; and whereas the
" Calendar now in use throughout all his Majesty's British
" dominions, commonly called The Julian Calendar, hath
" been discovered to be erroneous, by means whereof the
" vernal or spring equinox, which at the time of the General
" Council of Nice, in the year of our Lord three hundred
" and twenty-five, happened on or about the twenty-first
" day of March, now happens on the ninth or tenth day of
" the same month ; and the said error is still increasing,
" and if not remedied, would, in process of time, occasion
" the several equinoxes and solstices to fall at very different
" times in the civil year from what they formerly did,
" which might tend to mislead persons ignorant of the said
" alteration ; and whereas a method of correcting the Cal-
" endar in such manner as that the equinoxes and solstices
" may for the future fall nearly on the same nominal days
" on which the same happened at the time of the said
" General Council, hath been received and established, and
" is now generally practised by almost all other nations of
" Europe ; and whereas it will be of general convenience to
" merchants, and other persons corresponding with other
" nations and countries, and tend to prevent mistakes and
" disputes in or concerning the dates of letters, and ac-
" counts, if the like correction be received and established
" in his Majesty's dominions ; may it therefore please your
" Majesty," etc.

The act consists of six sections. The first section enacts that throughout all his Majesty's dominions in Europe, Asia, Africa, and America, after the last day of December, 1751, the 25th of March shall not be reckoned as the beginning of the year, and that the first day of January next following shall be reckoned as the first day of 1752, and so in all future years.

The same section further provides that Easter and the moveable feasts depending on it shall, after January 1st, 1752, and until September 2d, 1752, be ascertained as heretofore ; that the day next following the 2d of September shall be called and reckoned as the fourteenth day of September, omitting the eleven nominal intermediate days of the Calendar, and that all public and private proceedings whatsoever, after the 1st of January, 1752, should be dated accordingly.

The second section provides for the continuing and preserving the Calendar or method of reckoning and computing the days of the year in the same regular course, as near as may be, in all times coming, and further enacts, by the authority aforesaid, that the several years of our Lord, one thousand eight hundred, one thousand nine hundred, two thousand one hundred, two thousand two hundred, two thousand three hundred, or any other hundredth years of our Lord, which shall happen in time to come, except only every fourth hundreth year of our Lord, whereof the year of our Lord two thousand shall be the first, shall not be esteemed or taken to be bissextile or leap-years, but shall be taken to be common years, consisting of three hundred and sixty-five days, and no more ; and that the years of our Lord two thousand, two thousand four hundred, two thousand eight hundred, and every other fourth hundredth year of our Lord, from the said year of our Lord two thou-

sand, inclusive, and also all other years of our Lord, which, by the present supputation, are esteemed to be bissextile or leap-years, shall for the future, and in all times to come, be esteemed and taken to be bissextile or leap-years, consisting of three hundred and sixty-six days, in the same sort and manner as is now used with respect to every fourth year of our Lord.

The third section having premised that the method of ascertaining Easter, heretofore used in the Church of England, had become considerably erroneous, enacts that the said method should be discontinued, and that from and after the 2d of September, 1752, Easter day and the other moveable and other feasts should be reckoned according to the Calendar, Tables, aud Rules annexed to the act.

The fourth section of the act requires that Courts of Session and Exchequer in Scotland, and markets, fairs, and marts be held upon the same natural days as heretofore.

The fifth and· sixth sections contain minor regulations rendered necessary to avoid the uncertainty and embarrassments which, if not guarded against, would be consequent in business transactions on the proposed change ; such, for example, as the opening and closing of commons, payment of rents, etc., commencement or expiration of leases, etc., the attainment of the age of majority by minors, the expiration of apprenticeships, etc.

" The new Calendar, Tables, and Rules, mentioned and " referred to in the act for regulating the commencement " of the year, and for correcting the Calendar now in use," forms an appendix to the foregoing act, and is the same as the Calendar since given in the English Prayer Books.

Thus the Georgian reformers proclaimed to the world their purpose to inaugurate in Great Britain and in the Church of England the New Style of the Calendar, and the

Prayer Book, since 1752, gives us the results of their labour. Let us briefly examine these results.

In the first place, we find that the whole Lunar Calendar, which had been held sacred in the English Church for a thousand years, was, with the exception of a comparatively small part of it, obliterated at a stroke. The Paschal Feast, which can only be adjusted by reference to the annual course of the moon, was wrested from its connexion and made to stand alone ; as if the Church, wearied of God's own ordinance for the regulation of her annual solemnities, would choose some strange light which should shine like the dog-star, but for one month in the year. But of what use is the rest of the Lunar Calendar, provided the part which relates to Easter is preserved ? As if any cord, or any fibre of a cord, by which the Church innocently binds to herself the thoughts and affections of her children could be rudely snapped without in some way weakening her hold on them ! Time was when the owner of the soil and his tenants ; when the farmer, the artisan, men of all classes, whether toiling apart from the world or moving in its busy throng, used to consult the Calendar to learn from month to month the changes of the moon ; and learning from their Prayer Book, were they less likely to receive and apply their knowledge in the fear of God ? less apt to see in the luminary set over them to lighten the darkness of the night, an emblem of that Church, " the " blessed company of all faithful people," which God has set in this world of error and sin to reflect on it the rays of the " Sun of Righteousness ? " But I have no wish to argue the point. I wish merely to say, in passing, that it has never been the Church's wont to measure her aims by the world's standard of utility ; nor can I refrain from adding what I believe to be true, that in no other age of the

13

English Church, whether before or since her reformation from Popery, could the heirloom of a thousand years be torn from her without a protest on the part of some at least of her clergy.

Having resolved, however, to adopt the Gregorian reform, and at the same time to shut out of sight the Lunar Calendar, except so far as it had a direct bearing upon Easter, one might naturally have expected that the Parliament would give us that portion of the reformed Lunar Calendar which *does* bear directly upon Easter. In which case our Prayer Book for March and April would now stand as follows ; where the Paschal Term, being set opposite to every day of March and April on which it can possibly fall, enables us (with the knowledge of the Golden Number, the Epact and Sunday Letter for the year) to find Easter forever. (See page 195.)

Instead, however, of this luminous and unchangeable method for finding Easter, our Prayer Book, under the months of March and April, gives us the Golden Numbers for each year set opposite to the Paschal Term for that year, together with the following explanatory note : " The " Numbers prefixed to the several days (in the foregoing " Calendar), between the 21st of March and the 18th day " of April, both inclusive, denote the days upon which " those full moons do fall, which happen upon or next after " the 21st day of March, in those years, of which they are " respectively the Golden Numbers ; and the Sunday Let- " ter next following any such full moon points out Easter " day for that year. All which holds until the year of our " Lord 1899, inclusive ; after which year the place of these " Golden Numbers will be to be changed, as is hereafter " expressed."

To see the significancy of this note, it is necessary to

MARCH.

DAYS OF THE MONTH.	DOMINIC'L LETTERS.	EPACTS.	PASCHAL TERM.
1..........	D	*	
2..........	E	xxix	
3..........	F	xxviii	
4..........	G	xxvii	
5..........	A	xxvi	
6..........	B	25, xxv	
7..........	C	xxiv	
8..........	D	xxiii	Mar. 21
9..........	E	xxii	22
10..........	F	xxi	23
11..........	G	xx	24
12..........	A	xix	25
13..........	B	xviii	26
14..........	C	xvii	27
15..........	D	xvi	28
16..........	E	xv	29
17..........	F	xiv	30
18..........	G	xiii	31
19..........	A	xii	April 1
20..........	B	xi	2
21..........	C	x	3
22..........	D	ix	4
23..........	E	viii	5
24..........	F	vii	6
25..........	G	vi	7
26..........	A	v	8
27..........	B	iv	9
28..........	C	iii	10
29..........	D	ii	11
30..........	E	i	12
31..........	F	*	13

APRIL.

DAYS OF THE MONTH.	DOMINIC'L LETTERS.	EPACTS.	PASCH'L TERM.
1.	G	xxix	Apr. 14
2..........	A	xxviii	15
3..........	B	xxvii	16
4..........	C	25, xxvi	17
5..........	D	xxv,xxiv	18
6..........	E	xxiii	
7..........	F	xxii	
8..........	G	xxi	
9..........	A	xx	
10..........	B	xix	
11..........	C	xviii	
12..........	D	xvii	
13..........	E	xvi	
14.........	F	xv	
15..........	G	xiv	
16..........	A	xiii	
17..........	B	xii	
18..........	C	xi	
19..........	D	x	
20..........	E	ix	
21..........	F	viii	
22..........	G	vii	
23..........	A	vi	
24.........	B	v	
25..........	C	iv	
26.........	D	iii	
27..........	E	ii	
28..........	F	i	
29..........	G	*	
30..........	A	xxix	

compare the reformed English Calendar on this point, very
briefly, with the unreformed.

If the reader, then, will turn to the Calendar (pages 131–
148) as it stood in the Prayer Book before 1752, he will
find that the Golden Numbers are set opposite to the days
of the New Moon, and not as now, in the months of March
and April, opposite to the Paschal Term.   He will also
find that the new moons which are now assigned to one
year, or Golden Number, were before 1752 assigned to a
different year or a different Golden Number.   For example:
the Golden Number XIV, in our present Prayer Books,
points to the 21st of March as the Paschal Term, the new
moon falling in the same year on the 8th of March.   But
in the Calendar as it stood before 1752, the Golden Number
XIV is set opposite to the 30th of March, which brings
the Paschal Term to the 12th of April ; while opposite to
the 8th of March is, not XIV, but XVI.   The reason is
that the Calendar before 1752 gave the Golden Numbers
as they were adjusted to the Epacts soon after the Council
of Nice ; while the Prayer Book since 1752 gives the Golden
Numbers as readjusted by the Gregorian reformers.   Let
the reader refer to the Expanded Table of Epacts (p. 194),
and he will find that in the line P, which represents the
Epacts as they corresponded to the Golden Numbers at the
time of the Council of Nice, the Epact xxiii falls under the
sixteenth year of the Cycle.   But when the error in the use
of the Lunar Cycle was corrected, and the Epacts were
accurately adjusted forever to the solar time, it appeared
that, from the year 1700 to the year 1899, xxiii would be
the Epact, not as in the fourth century for the sixteenth,
but for the fourteenth year of the Cycle ; whence in the
Expanded Table, in the line C, which is in use from 1700
to 1899, the Epact for the year, xxiii, is found under the

Golden Number XIV. So that what the Act of George II did, in the note under consideration, was simply to adjust the Epacts to the Golden Numbers after the pattern of the Gregorian reformers from the year 1700 to the year 1899 ; and to promise us, at the end of their note, a fresh instalment of the Gregorian readjustment which would come in play in the year 1900.

Now, if the reader will turn to the reformed Lunar Calendar, he will find that the Epact for the 8th of March is 23 ; the meaning of which is that whenever 23 is the Epact for the year, the 8th of March is the day of the Paschal new moon ; and that consequently the Paschal Term for the same year is the 21st of March. In the course of centuries (adhering to the Anglican scheme), the Golden Numbers must be shifted until every one of them comes in turn to be set opposite to the 21st of March ; while for all time, whatever be the Golden Number for the year, the Epact 23 stands unchangeably in the Gregorian Calendar opposite to the 8th of March ; showing that when 23 is the Epact for the year, be it now or a thousand years hence, the 21st of March is for that year the Paschal Term : so with the other Epacts respectively from March 8th to April 18th. Now the distinctive feature of the Gregorian reform is the substitution of the system of Epacts for finding Easter in the place of the Golden Numbers as used in the Old Style of the Calendar. To say that the Anglicans have adopted the Gregorian reform is only to say, in other words, that they have adopted the Gregorian Epacts ; and if they followed the Gregorian Epacts for finding Easter themselves, why not insert the Epacts in their Calendar for enabling the people to find Easter ? Why direct us to Easter by the Golden Numbers, with complicated tables for changing them, century after century, instead of direct-

ing us to find Easter by means of the simple and immutable system of Epacts?

"The Church of England," says Dr. Jarvis, in his profoundly learned "Introduction to the History of the "Church," "did not adopt the Gregorian Calendar, but "continued to use that of the aṇcient Church. The only "difference made was to adjust that Calendar to the "modern retrenchment." This view I would gladly adopt, if I could; but it seems to me more in accordance with facts to say that both the Church of Rome and the Church of England continue to ūs⁻ the old Church Calendar; that to the Church of Rome exclusively belongs the credit of reforming that Calendar, the distinctive feature of the reform consisting in the removal of the Golden Numbers from the Lunar Calendar and substituting the Epacts in their place; and that the Church of England, under the direction of Parliament, adopted the Roman reform, only keeping the Epacts out of sight and continuing to use the Golden Numbers (in that part of the Lunar Calendar which she retained) to indicate the age of the Paschal Moon until the end of the present century; providing also Tables for shifting them hereafter as occasion might require. Whether Parliament were induced to pursue this course because the Epacts were regarded in that age as a symbol of popery, and the obtrusion of them might provoke the cry, "Give us back our Golden Numbers!"—as another part of the reform had provoked the cry, "Give us back "our eleven days!"—or from some other and more laudable motive, I am unable to discover. One advantage, however, it must be admitted that our present Church Calendar possesses; which is, that the Golden Numbers are placed opposite to the Paschal Terms, and not, as formerly, opposite to the new moons.

CHAPTER XVII.

HAVING thus referred to the principle on which the
framers of the 24th of George II constructed the
Appendix to which our present Church Calendar owes its
reform, I go now to examine briefly the " Tables for finding
" Easter," present and prospective, special and general,
which form the distinctive feature of the Calendar in the
Anglican and American Prayer Book.

The first Table is entitled, " A Table to find Easter-day
" from the present time till the year 1899, inclusive."

Next comes, " Another Table to find Easter from the
present time until the year 1899, inclusive."

And here let us note the precision of the language " till
" the year 1899, inclusive," and not *until the end of the cen-
tury.* For in the natural computation of time the century
ends, not at the beginning, but at the expiration of the year
1900. The Gregorian reformers, however, on readjusting
the Epacts to the Golden Numbers, found it convenient to
begin the lines of Epacts for different centuries with the
centurial years. For example, the line D (compare the
Table of Expanded Epacts, pp. 132, 133, and the Table of
Equations, etc., page 149), which came first into use after
the reformation, begins with the year 1500 and ends with
1699 ; the line C begins with the year 1700 and ends with
1899 ; and the line B begins with 1900 and ends with the
year 2199, the years named being always inclusive. So

that the expression in the Table is accurate, however otherwise it may seem to those who are conversant only with historical divisions of time.

The first Table simply reproduces, in an expanded form, the marginal direction for the months of March and April, and the explanatory note connected with it. It may be well, however, to explain the process by which the Table is constructed, whence it will be seen that the Statute of George II, though it makes no mention of the Gregorian Calendar either in the preamble or in the act itself, has merely given the results of that Calendar, and set forth Tables which would have been as useless as they are perplexing, had the statute either adopted the reformed Lunar Calendar entire, or only that portion of it which extends from March 8th to April 25th, inclusive. The Table is as follows:

A TABLE TO FIND EASTER DAY FROM THE PRESENT TIME TILL THE YEAR 1899, INCLUSIVE.

Golden Numbers.	Days of the month.	Sunday Letters.
XIV	Mar. 21	C
III	22	D
	23	E
XL	24	F
	25	G
XIX	26	A
VIII	27	B
	28	C
XVI	29	D
V	30	E
	31	F
XIII	April 1	G
II	2	A
	3	B
X	4	C
	5	D
XVIII	6	E
VII	7	F
	8	G
XV	9	A
IV	10	B
	11	C
XII	12	D
I	13	E
	14	F
IX	15	G
	16	A
XVII	17	B
VI	18	C
	19	D
	20	E
	21	F
	22	G
	23	A
	24	B
	25	C

THIS Table contains so much of the Calendar as is necessary for the determining of *Easter ;* to find which, look for the Golden Number of the year in the first column of the Table, against which stands the day of the Paschal Full Moon ; then look in the third column for the Sunday Letter next after the day of the Full Moon ; and the day of the month standing against that Sunday Letter is *Easter Day.* If the Full Moon happen upon a Sunday, then (according to the first rule) the next Sunday after is *Easter Day.*

To find the Golden Number, or Prime, add 1 to the year of our Lord, and then divide by 19; the remainder, if any, is the Golden Number; but if nothing remain, then 19 is the Golden Number.

To find the Dominical or Sunday Letter, according to the Calendar, until the year 1899, inclusive, add to the year of our Lord its fourth part, omitting fractions, divide the sum by 7, and if there be no remainder, then A is the Sunday Letter; but if any number remain, then the Letter standing against that number in the small annexed Table is the Sunday Letter.

0	A
1	G
2	F
3	E
4	D
5	C
6	B

NOTE, That in all Bissextile or Leap Years, the Letter found as above will be the Sunday Letter from the intercalated day exclusive to the end of the year.

MODE OF CONSTRUCTION.

First, for convenience sake, make a schedule of the correspondence between the Golden Numbers and the Epacts from 1700 to 1899. Thus:

Golden Numbers.	Epacts.	Golden Numbers.	Epacts.
I.....................	*	XI................	20
II....................	11	XII...............	1
III...................	22	XIII..............	12
IV...................	3	XIV..............	23
V ...., ...	14	XV...............	4
VI...................	25	XVI..............	15
VII..................	6	XVII.............	26
VIII.................	17	XVIII	7
IX...................	28	XIX	18
X	9		

The earliest day on which the Paschal Moon can begin is March the 8th. On reference to the reformed Lunar Calendar, we find that the Epact for March the 8th is xxiii, and from the above schedule it appears that xxiii is the Epact for the year of which XIV is the Golden Number. The moon which begins on the 8th day of March is full on the 21st day of March, the proper letter of which is C. Set down XIV, and in the same line with it on the right, March 21st, C. Thus:

XIV—March 21st—C.

The Epact for the year next less than xxiii is xxii, and the Golden Number for the same year is III. From the reformed Lunar Calendar we learn that xxii is the Epact for the 9th day of March, the Paschal Moon being consequently full on the 22d day of March, the proper letter of which is D. As the 22d day of March is next in order to the 21st, write the result immediately under the first line of the Table, without an intervening space. Thus:

XIV—March 21st—C.
III—March 22d—D.

The Epact for the year next less than xxii is xx, and the
Golden Number corresponding to it is XI. From the
reformed Lunar Calendar it appears that xx is the Epact
for the 11th day of March, showing that the Paschal Moon
is full in that year on the 24th of March, the proper letter
of which is F. As the 24th of March is the next day but
one to the 22d, write first for the third line of the Table,
under III, March 23d—E, and immediately under it XI—
March 24th, F. The Table will then stand thus :

<div align="center">

XIV—March 21st —C.

III—   "   22d —D.

—   "   23d —E.

XI—   "   24th—F.

</div>

Proceed in the same way with the other Epacts ; taking
successively, for each new line of the Table, the Epact
which is next less than that of the year which immediately
preceded it, until you come to the symbol * ; setting down
in each instance the Golden Number, the day of the Pas-
chal full moon, and the week-day letter ; being careful to
write the day of the Paschal full moon in the same line
with the Golden Number, and to refer the intervening day,
if any, to the line next preceding. Having descended in
this way to the symbol *, take then the highest Epact,
which in the present case is 28, and descend, as before, till
you come to the Epact (in the present case 25), which is
next greater than the Epact 23 with which you began.
You will then have exhausted all the Epacts for the Pas-
chal Moon which can occur between 1700 and 1899 ; begin-
ning with xxiii, which is the Epact for March the 8th, and
ending with xxv, which is the Epact for April the 5th.
The moon which begins on April the 5th is full on April
the 18th ; and as April the 18th may happen to be Sunday,
in which case Easter day will fall on the Sunday after, you

continue the days of the month from April 18th to April 25th, giving only the letters proper to the several days. Thus the first Table to find Easter is seen to consist of the Epacts as readjusted to the Golden Numbers by the Gregorian reformers.

"Another Table to find Easter until 1899, inclusive," is formed on the same principle as the first Table ; the difference being that in the first Table the compilers follow the order of the Epacts, and in the second the order of the Golden Numbers.

After this we have "A Table to find Easter from the "year 1900 to the year 2199, inclusive." The design of the Calendar is that in the year 1900 the Table now in use should be set aside, and that the Table from 1900 to 2199 should take its place. The heading will then be "A Table "to find Easter day from the present time till the year "2199, inclusive ; " and the explanations and directions belonging to the present Table will be transferred *mutatis mutandis* to the new Table.

This Table will also contain the rule to find the Dominical Letter until the year 2199, which will then stand substantially as follows :

"To find the Dominical or Sunday Letter, according to "the Calendar, until the year 2099, inclusive,
"add to the year of our Lord its fourth part,
"omitting fractions ; divide the sum less 1
"by 7, and if there be no remainder, then
"A is the Sunday Letter ; but if any number
"remain, then the letter standing against that
"number in the small annexed Table is the Sunday Letter.

0	A
1	G
2	F
3	E
4	D
5	C
6	B

"For the century next following the above named, that "is, from the year 2100 till the year 2199, inclusive, add to

" the current year its fourth part, omitting fractions ; divide
" the sum less 2 by 7, and proceed as in the last rule."

For the *rationale* of this process of finding the Dominical
Letter, see above pages 163, 164.

As there are now two Tables in our Prayer Book to find
Easter from the present time until the year 1899, so in the
next century there will be two Tables to find Easter from
the year 1900 until 2199. It is superfluous for us to
exhibit both these Tables ; the second of them will stand
as follows :

A TABLE TO FIND EASTER DAY FROM THE YEAR 1900 TILL THE YEAR
2199, INCLUSIVE.

GOLDEN NUMBER.	SUNDAY LETTERS.						
	A	B	C	D	E	F	G
I............	16 April	17 ——	18 ——	19 ——	20 ——	21 ——	15 ——
II..........	9 April	10 ——	4 ——	5 ——	6 ——	7 ——	8 ——
III.........	26 March	27 ——	28 ——	29 ——	30 ——	— ——	25 ——
IV.........	16 April	17 ——	18 ——	12 ——	13 ——	14 ——	15 ——
V..........	2 April	3 ——	4 ——	5 ——	6 ——	7 ——	1 ——
VI.........	23 April	24 ——	25 ——	19 ——	20 ——	21 ——	22 ——
VII	9 April	10 ——	11 ——	12 ——	13 ——	14 ——	15 ——
VIII.......	2 April	3 ——	4 ——	29 March	30 ——	31 ——	1 April
IX.........	23 April	17 ——	18 ——	19 ——	20 ——	21 ——	22 ——
X..........	9 April	10 ——	11 ——	12 ——	6 ——	7 ——	8 ——
XI.........	26 March	27 ——	28 ——	29 ——	30 ——	31 ——	1 April
XII........	16 April	17 ——	18 ——	19 ——	20 ——	14 ——	15 ——
XIII.......	9 April	3 ——	4 ——	5 ——	6 ——	7 ——	8 ——
XIV.......	26 March	27 ——	28 ——	29 ——	23 ——	24 ——	25 ——
XV...	16 April	17 ——	11 ——	12 ——	13 ——	14 ——	15 ——
XVI.......	2 April	3 ——	4 ——	5 ——	6 ——	31 March	1 April
XVII......	23 April	24 ——	18 ——	19 ——	20 ——	21 ——	22 ——
XVIII.....	9 April	10 ——	11 ——	12 ——	13 ——	14 ——	8 ——
XIX	2 April	3 ——	28 March	29 ——	30 ——	31 ——	1 April

To make use of the preceding Table, find the Sunday Letter for the
year in the uppermost line, and the Golden Number in the column of
Golden Numbers, and against the Golden Number in the same line
under the Sunday Letter you have the day of the month on which
Easter falleth that year. But

Note that the name of the month is set on the left hand, or just with
the figure, and followeth not by descent, as in other Tables, but colla-
terally.

When " A Table to find Easter day for the year 1900 to
" the year 2199, inclusive," shall have become " A Table to
" find Easter day from the present time until the year
" 2199, inclusive," our Calendar authorizes and directs us
how to construct a new Table, which is to be headed,
" A Table to find Easter day from the year 2200 to the
" year ——, inclusive." How is the blank to be filled up ?
and in what order are the Golden Numbers then to be set ?

The reason why the former Table extended from 1900 to
2199 is, that in the year 1900 the solar equation must be
made, which consists in diminishing the Epacts by unity.
Thenceforward, for reasons explained in Chapter XIII, there
will be no change in the line of Epacts until the year 2199.
In the year 2200, however, the solar equation must again
be made, and as the same equation must also be made in
the year 2300, the new Table will be " A Table to find
" Easter from the year 2200 to the year 2299, inclusive."

After what has been said, the way of forming the Table
is sufficiently apparent. From 2200 to 2299 the Golden
Numbers and Epacts will stand as follows :

Golden Numbers.	Epacts.	Golden Numbers.	Epacts.
I....................	28	XI	18
II...................	9	XII	29
III..................	20	XIII...............	10
IV	1	XIV...............	21
V	12	XV.................	2
VI	23	XVI...............	13
VII..................	4	XVII	24
VIII.................	15	XVIII.............	5
IX	26	XIX	16
X	7		

And proceeding in the same way as was explained in the construction of the first Table, we obtain the following result:

A TABLE TO FIND EASTER DAY FROM THE YEAR 2200 TO THE YEAR 2299, INCLUSIVE.

Golden Numbers.	Days of the month.	Sunday Letters.	Golden Numbers.	Days of the month.	Sunday Letters.
VI	March 21	C	XVIII	April 8	G
	22	D	VII	9	A
XIV	23	E		10	B
III	24	F	XV	11	C
	25	G	IV	12	D
XI	26	A		13	E
	27	B	XII	14	F
XIX	28	C	I	15	G
VIII	29	D		16	A
	30	E	IX	17	B
XVI	31	F	XVII	18	C
V	April 1	G		19	D
	2	A		20	E
XIII	3	B		21	F
II	4	C		22	G
	5	D		23	A
X	6	E		24	B
	7	F		25	C

We are thrown next on that wilderness of figures which constitute the second and third of our " General Tables." In the particular Tables for finding Easter, we are instructed how the Golden Numbers are to be set until the year 2199, and the object of these two General Tables is to direct us how they are to be set for all time to come. In

some centuries these numbers are to be set a line lower than they had previously stood, and in other centuries a line higher, and the design of these General Tables is to authorize and direct whatever changes of this kind may be required for future ages; so that there shall never be a necessity for going outside the Prayer Book Calendar, but that the authority for making all needful changes shall be contained in the Calendar itself.

The rules thus given are arbitrary, that is to say, they contain no hint of the principles on which they are formed. This, of course, was unavoidable, it being necessarily the design of the statute to make rules and explain their mode of operation, but not to justify them or develope their

TABLE II.

1	2	3	1	2	3
	Years of our Lord.			Years of our Lord.	
B	1600	0	B	5200	15
	1700	1		5300	16
	1800	1		5400	17
	1900	2		5500	17
B	2000	2	B	5600	17
	2100	2		5700	18
	2200	3		5800	18
	2300	4		5900	19
B	2400	3	B	6000	19
	2500	4		6100	19
	2600	5		6200	20
	2700	5		6300	21
B	2800	5	B	6400	20
	2900	6		6500	21
	3000	6		6600	22
	3100	7		6700	23
B	3200	7	B	6800	22
	3300	7		6900	23
	3400	8		7000	24
	3500	9		7100	24
B	3600	8	B	7200	24
	3700	9		7300	25
	3800	10		7400	25
	3900	10		7500	26
B	4000	10	B	7600	26
	4100	11		7700	26
	4200	12		7800	27
	4300	12		7900	28
B	4400	12	B	8000	27
	4500	13		8100	28
	4600	13		8200	29
	4700	14		8300	29
B	4800	14	B	8400	29
	4900	14		8500	0
	5000	15		&c.	
	5100	16			

TO find the month and days of the month to which the Golden Numbers ought to be prefixed in the Calendar in any given year of our Lord, consisting of entire hundred years, and in all the intermediate years betwixt that and the next hundredth year following, look in the second column of Table II for the given year, consisting of entire hundreds; and note the number or cypher which stands against it in the third column; then in Table III look for the same number in the column under any given Golden Number, which when you have found, guide your eye sideways to the left hand, and in the first column you will find the month and day to which that Golden Number ought to be prefixed in the Calendar, during that period of one hundred years.

The Letter B, prefixed to certain hundredth years in Table II, denotes those years which are still to be accounted Bissextile or Leap Years in the new Calendar; whereas all the other hundredth years are to be accounted only common years.

TABLE III.

Paschal Full Moon.	Sunday Letter.	THE GOLDEN NUMBERS.																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Mar. 21	C	8	19	0	11	22	3	14	25	6	17	28	9	20	1	12	23	4	15	26
22	D	9	20	1	12	23	4	15	26	7	18	29	10	21	2	13	24	5	16	27
23	E	10	21	2	13	24	5	16	27	8	19	0	11	22	3	14	25	6	17	28
24	F	11	22	3	14	25	6	17	28	9	20	1	12	23	4	15	26	7	18	29
25	G	12	23	4	15	26	7	18	29	10	21	2	13	24	5	16	27	8	19	0
26	A	13	24	5	16	27	8	19	·0	11	22	3	14	25	6	17	28	9	20	1
27	B	14	25	6	17	28	9	20	1	12	23	4	15	26	7	18	29	10	21	2
28	C	15	26	7	18	29	10	21	2	13	24	5	16	27	8	19	0	11	22	3
29	D	16	27	8	19	0	11	22	3	14	25	6	17	28	9	20	1	12	23	4
30	E	17	28	9	20	1	12	23	4	15	26	7	18	29	10	21	2	13	24	5
31	F	18	29	10	21	2	13	24	5	16	27	8	19	0	11	22	3	14	25	6
April 1	G	19	0	11	22	3	14	25	6	17	28	9	20	1	12	23	4	15	26	7
2	A	20	1	12	23	4	15	26	7	18	29	10	21	2	13	24	5	16	27	8
3	B	21	2	13	24	5	16	27	8	19	0	11	22	3	14	25	6	17	28	9
4	C	22	3	14	25	6	17	28	9	20	1	12	23	4	15	26	7	18	29	10
5	D	23	4	15	26	7	18	29	10	21	2	13	24	5	16	27	8	19	0	11
6	E	24	5	16	27	8	19	0	11	22	3	14	25	6	17	28	9	20	1	12
7	F	25	6	17	28	9	20	1	12	23	4	15	26	7	18	29	10	21	2	13
8	G	26	7	18	29	10	21	2	13	24	5	16	27	8	19	0	11	22	3	14
9	A	27	8	19	0	11	22	3	14	25	6	17	28	9	20	1	12	23	4	15
10	B	28	9	20	1	12	23	4	15	26	7	18	29	10	21	2	13	24	5	16
11	C	29	10	21	2	13	24	5	16	27	8	19	0	11	22	3	14	25	6	17
12	D	0	11	22	3	14	25	6	17	28	9	20	1	12	23	4	15	26	7	18
13	E	1	12	23	4	15	26	7	18	29	10	21	2	13	24	5	16	27	8	19
14	F	2	13	24	5	16	27	8	19	0	11	22	3	14	25	6	17	28	9	20
15	G	3	14	25	6	17	28	9	20	1	12	23	4	15	26	7	18	29	10	21
16	A	4	15	26	7	18	29	0	11	2	13	24	5	16	27	8	19	0	11	22
17	B	5	16	27	8	19	0	11	22	3	14	25	6	17	28	9	20	1	12	23
17	B												7	18	29	10	21	2	13	24
18	C	6	17	28	9	20	1	12	23	4	15	26								
18	C	7	18	29	10	21	2	13	24	5	16	27	8	19	0	11	22	3	14	25

theory. To this end we must look outside of our English Calendar; but if the reader has followed us in what we have said in a previous chapter in explanation of the Gregorian reform, he will readily take in not only the directions which are given in these two General Tables, but the reasons on which these directions are founded. [For Table I, *v. supra*, Chap. XIV. Tables II and III are as above.]

The first of these Tables contains a period of eight thousand five hundred years, because in that time there will have been a complete revolution of the Epacts; and as in every century in which a solar or lunar equation is to be made, there will be a change in the line of Epacts, so we have in Table II thirty numbers (including the cipher after

29) corresponding to the different lines of Epacts in the
Expanded Table, and varying for different centuries as the
use of these lines varies. Thus as the year 1600 (after the
ten days had been expunged from the Old Style) was the
first century of the new era, and no equation was made in
it, a cipher is set opposite to it. In 1700 we descend *one*
line in the Expanded Table and continue to use the same
line for the century following ; and accordingly 1 is set
opposite to 1700 and 1800. In 1900 we descend another
line (2 in all) and continue to use the same line for the next
two centuries ; and accordingly 2 is set opposite to 1900,
2000, and 2100. In the year 2200 we descend to the third
line below that from which we started in 1600, and accord-
ingly the number 3 is set opposite to 2200. In 2300 we
descend to the *fourth* line and opposite to it is the number
4. In each one of these cases, that is to say, in 1700, 1900,
2200, and 2300, the solar equation is made which requires
the Golden Numbers to be set one line lower ; but in the
year 2400 the lunar equation is to be made which requires
the same numbers to be set one line higher ; and hence
opposite to 2400 in the second General Table is the number
3 ; which means that in 2400 we are to go back and set the
Golden Numbers in our Tables for finding Easter as they
stood in the year 2200. And so the Table proceeds ;—
changing the number opposite to the century only when
there is a change in the line of the Epacts, and *increasing*
or *diminishing* the numbers accordingly as we *descend* or
ascend in the Expanded Table—until the thirty Epacts, or
rather the thirty figures which in our " General Tables "
represent them, are exhausted. The Table, therefore, takes
account of all the solar and lunar equations for as many
centuries as will embrace a complete revolution of the
Epacts

The first column of the third General Table contains all the days on which the Paschal Term can fall, and the directions in the first General Table explain the way in which the two Tables are to be used. For example : in the first Table opposite to 2200 we find the figure 3, which shows that in the beginning of that century the Golden Numbers are to be set two lines lower than they now stand. In the other Table we find 3 under the Golden Number VI in the same line with March 21st, and under XIV in the same line with March 23d. One thing, however, the Rule has omitted, which it is important to note, viz., that when the figure taken from Table II is not found in Table III under any Golden Number in the line parallel with the day of the month, then this day must be placed under the same Golden Number as the day preceding.

The object, then, of these Tables is, as we have said, to let us know at the beginning of every century whether any, and, if any, what change is to be made so as to keep the solar and lunar time in agreement. The peculiarity of our method is that instead of saying that the solar time is to be kept in harmony with the Epacts or age of the moon, the word Epact is put under a ban and the Golden Numbers of the old Calendar are still retained, and we are charged to see to it that at the beginning of every century they are duly adjusted to the Paschal Term.

There can be no doubt that the framers of the Act (24 George II) which we have been considering, thoroughly understood their subject ; and it is equally fair to presume that as wise legislators they were resolved not to sacrifice utility to theory ; to attempt nothing impracticable, but to content themselves with establishing the reform they had undertaken, not simply in the best way, but in the best way which was likely to meet with general acceptance.

14

They knew the temper of their times ; and if they thought the Gregorian Epacts would be considered to be a badge of popery, and that the adoption or rather (for adopted they were) the public recognition of them would lead men otherwise intelligent to reject the proposed reform, what better could they do than they have done ? With no other knowledge than I have of the history of the times, I am not disposed to judge the British reformers of the Calendar harshly, or to censure them for what they have done. On the contrary, I am grateful to them for their labours, and for giving us the best measure of reform which the times permitted. Certainly, however, if I supposed that they themselves were of the opinion that their use of the Golden Numbers and their complicated Tables, particular and general, for shifting them from century to century, excelled the simplicity of the Gregorian system which had been ready to their hands for more than a hundred years, I should hold them in very different estimation.

CHAPTER XVIII.

THE truth of the Mosaic record has been of late years
impugned by two very different classes of persons;
first by those who are unable to reconcile the credibility of
the record to the recent discoveries of Geology; and sec-
ondly by various theorists who fancy that they can account
for the origin of the universe without the fiat of the Creator.

To the former we reply that Revelation confirmed by
supernatural evidence—such as Miracles and Prophecy, the
main pillars of the Christian fabric—cannot be contradicted
by natural facts, for the obvious reason that the superna-
tural works and the natural have the same GOD for their
author. Revelation, therefore, and true science are always
and of necessity in harmony; and whensoever a seeming
repugnance exists, time will show, as it has often shown,
that the repugnance is really between the interpreters of
revelation and the expounders of science; for both are fal-
lible, and either the former puts a wrong construction on
the revelation, or the latter gives us hypothesis for facts.
Religion has nothing to fear from true science; and science,
while it faithfully interprets nature, cannot cross religion,
and may minister to her ends.

To the latter class of persons it is enough to say that the
words " In the beginning GOD created the heavens and the

" earth " were dictated by GOD himself to save them, if
they accept the truth, from the folly and guilt of ascribing
the origin of the universe to spontaneous " evolution " and
" effort ; " a theory which, if it should find general accept-
ance, would serve to show that with all our boast of
" progress," the childhood of our race has not yet ripened
into manhood. For the advocates of this and its kindred
theories really move in the same plane with Democritus
and Epicurus, who had need of a first-class poet to keep
their memories alive even among Pagans ; or with the later
peripatetics who, arguing from the axiom—true only in
nature—*Ex nihilo nihil fit*, taught the eternity of matter ;
ignorant of the sublime fact which nature could never dis-
cover, but which holy Scripture reveals, that " In the
" beginning "—before time was—" GOD created the heavens
and the earth." *

In fact, however, and this is the point to which I wish to
draw the reader's attention, let men argue and speculate as
wantonly as they will, they can no more escape from the
Word of GOD than from His presence ; for He has made
the truth of the Mosaic record a necessary condition of
their culture and advancement. It is reasonable for all
men, says a modern authority which cannot be suspected
of undue partiality for the Scriptures, to accept the Mosaic
account of the creation. " But an historian," he adds,
" is under an absolute necessity of doing so, because with-
" out it he is destitute of any standard, or scale, by which
" he can reduce the chronology of different nations to agree-
" ment ; indeed without receiving this account as true, it

---

* In common, as he believes, with all churchmen, the author is happy to
have an opportunity to express his obligations to Dr. McCosh, the distin-
guished President of Princeton College, for his late luminous exposure
and triumphant refutation of the Atheistic theories referred to in the
text.

" would be in a manner impossible at this day to write a
" general history of the world." *

And as the Church under the Mosaic dispensation gave
not to one nation only, but to all mankind, a standard of
chronology which enables us to bring the materials of his-
tory out of darkness and confusion into light and order, so
does the same Church, under the Christian dispensation,
pursue even those who flee from her, and incline them, as it
were, by a sort of providential compulsion, to accept analo-
gous benefits at her hands.

A Calendar for the measurement and distribution of
time is a necessity for every civilized nation, and it appears
from what has been said already that all nations in Europe
and America have received their Calendar from the Chris-
tian Church. I venture to add that so dependent are these
nations on the Church in this matter, so interwoven are
their interests and convenience with her labours, that not
one of them can create and bring into established use any
other Calendar than that which the Church has bestowed
on them. An example of this dependence, well known but
perhaps not enough considered, offers itself as a fitting con-
clusion for our review of the Church Calendar.

The Revolution of 1792 in France was carried forward in
part by men who shrank from its horrors, and were ani-
mated with an honest and patriotic desire to get rid of
intolerable abuses, and to reform society on new and better
principles. These were men of generous instincts and of
lofty and highly cultivated genius. They were, however,
republicans in government and, unhappily, infidels in reli-
gion ; and instead of accepting prescriptive institutions and
endeavouring to amend them, they impatiently rejected, and

---

* Encyclopedia Britannica, seventh edition, article " History."

sought to pull them down in the fallacious hope that they could build up new and better structures in their stead. They would reconstruct society upon what they considered to be " philosophic principles ; " which simply means that they would follow their own wisdom or that of the age in which they lived, without steadying themselves by the judgment and experience of the past.

In this spirit the men of the Revolution, among other radical changes, abolished the Calendar of the Church and set up the " Calendar of Reason " in its place. The Calendar of the Church was cast away as the growth of superstition ; the Calendar of Reason was ushered in that the French people, and after their example all mankind, might learn to measure and distribute time without the help of tradition and agreeably to the dictates of reason and philosophy. The year in the new Calendar was made to begin with the 22d day of September, the day of the autumnal equinox, which chanced also to be the day on which the French Republic was founded ; a day that would thus become, it was hoped, the epoch of a new and glorious era which would perpetuate the memory of the Republic after the Christian era had become obsolete. The three hundred and sixty days were divided into months of thirty days each, and each month in turn into decades, with a view to the advantages of the decimal notation for the smaller divisions of time. The decadery days, that is to say, the first days of the several decades, were dedicated with such show of religion as unassisted reason could inspire, the first to Nature and the Supreme Being, the second to the human race, the third to the French people, the fourth to the benefactors of humanity, the fifth to the martyrs of liberty, the sixth to liberty and equality, the seventh to the Republic, the eighth to the liberty of mankind, the ninth to the love

of our country, and the tenth to the hatred of tyrants ; those from the eleventh to the twenty-sixth were dedicated to various virtues, real or fictitious ; and the remainder to infancy, youth, manhood, etc., unto the thirty-sixth, which was dedicated to prosperity. The intercalary or complementary days, vulgarly known as the *Sans Culottides*, viz., the 17th, 18th, 19th, 20th, and 21st, to which in leap-years was added the 22d of September, were dedicated to virtue, to genius, to labour, etc. ; making in all forty-one and in leap-years forty-two gala days which were set apart for the rest and merriment of the *Decadists*, instead of the fifty-two Lord's days which were still clung to by the *Dominicans ;* as the followers of the new and the old mode of reckoning were respectively called.

Such, omitting its more fantastic features, is the Calendar of Reason constructed by the illustrious philosophers of the French Republic to supplant the Calendar of the Church. It was presented to the Convention on the 5th of October, 1793, and having been duly ratified was first used on November 24th of the same year. It was little more than the bauble of a day. On the 31st of December, 1805, in compliance with the report of the celebrated La Place, who was at the head of the Commission to which the subject was referred, the Calendar of Reason was abrogated and the Calendar of the Church was restored ; the decades were abolished and the Lord's day resumed the place assigned to it by the Church. The motives which induced the government to retreat from its infidel position and to re-establish the Calendar of the Church are given in the following Report of La Place to the Senate, the translation of which is taken from Ree's Cyclopedia :

SENATORS—The project of the *Senatus Consultum* which was presented to you in the last sitting, and on which you

are going to deliberate, has for its object the restoration in
France of the Gregorian Calendar, reckoning from the first
of January, 1806. It is not necessary at present to examine
which of all the Calendars possible is the most natural and
the most simple ; we shall only say that it is neither the
one we are about to abandon, nor that which we propose to
resume. The orator of Government has explained to you
with great care their inconveniences and disadvantages.
The principal fault of the present Calendar is its intercala-
tion. By fixing the commencement of the year at the
midnight which at the Observatory of Paris precedes the
true autumnal equinox, it fulfils, indeed, in the most rigor-
ous manner, the condition of constantly attaching to the
same season the origin of the year ; but then they cease to
be periods of regular time easy to be decomposed into days,
which must occasion confusion in chronology, already too
much embarrassed by the multitude of eras. Astronomers,
to whom this defect is very sensible, have several times
requested a reformation of it. Before the first bissextile
year was introduced into the new Calendar, they proposed
to the Committees of Public Instruction of the National
Convention to adopt a regular intercalation, and their de-
mand was favorably received. At that period the convention
returned to good principles ; and employing itself with in-
struction and the progress of knowledge, showed to the
learned a deference and consideration, the remembrance of
which they retain. They will always recollect, with lively
gratitude, that several of its members, by a noble devotion,
in the midst of the storms of the revolution, preserved from
total destruction the monuments of the sciences and the
arts. Romme, the principal author of the new Calendar,
convoked several men of letters ; he drew up, in concert
with them, the project of a law, by which a regular mode
of intercalation was substituted for the mode before estab-
lished ; but involved a few days after in a horrid event, he
perished, and his project of a law was abandoned. It
would, however, be necessary to recur to it, if we preserved
the present Calendar ; which being thereby changed in one
of its most essential elements, would present the irregularity
of a first bissextile placed in a third year. The suppres-
sion of the decades made it experience a more considerable
change. They gave the facility of finding every moment of
time of the month ; but at the end of each year the com-
plementary days disturbed the order of things attached to
the different days of the decade, which then rendered admi-

nistrative measures necessary. The use of a small period
independent of months and years, such as the week, obvi-
ates this inconvenience ; and already that period has been
re-established in France ; which since the highest antiquity,
in which its origin is lost, circulates without interruption
through centuries, mingling with the successive Calendars
of different nations.

But the greatest inconvenience of our new Calendar is
the embarrassment which it produces in our foreign rela-
tions, by insulating us, in that respect, in the midst of
Europe ; which would always exist, for we ought not to
hope that this Calendar can ever be universally admitted.
Its epoch relates merely to our history ; the moment when
its year commences is placed in a disadvantageous manner,
as it participates in, and divides between, two years the
same operations and the same labours ; it has inconve-
niences which would be introduced into civil life, as the
day begins at noon according to the usage of astronomers.
Besides, this custom would relate only to the meridian of
Paris. In seeing others reckon the longitude from their
principal observatories, can it be believed that they would
all agree in referring to the commencement of our year ?
Two centuries were necessary, and the whole influence of
religion, to cause the Gregorian Calendar to be generally
adopted. It is in this universality, so desirable and so dif-
ficult to be attained, and which it is of importance to pre-
serve when it is acquired, that its greatest advantage con-
sists. This Calendar is now that of almost all the nations
of Europe and America. It was a long time that of France ;
at present it regulates our religious festivals, and it is ac-
cording to it that we reckon our centuries. It no doubt
has several considerable defects. The length of its months
is unequal and whimsical, the origin of the year does not
correspond to any of the seasons ; but it answers very well
the principal object of a Calendar, by being easily decom-
posed into days, and retaining nearly the commencement of
the mean year at the same distance from the equinoxes.
Its mode of intercalation is convenient and simple. It is
reduced, as is well known, to the intercalation of a bissextile
every four years ; the suppression of it at the end of each
century for three consecutive centuries in order to re-esta-
blish it at the fourth ; and if, by following this analogy, we
still suppress a bissextile every four thousand years, it will
be founded on the true length of the year. But even in its
present state, forty centuries would be necessary to remove,

only by one day, the origin of the mean year from its real origin. The French mathematicians, therefore, have never ceased to object to their astronomical table; become, by their extreme precision, the base of the ephemerides of all enlightened nations.

One might be afraid that the return of the old Calendar might be followed by the re-establishment of the old measures. But the orator of Government has taken care to dispel that fear. Like him, I am persuaded, that instead of re-establishing the prodigious number of different measures which prevailed in France and shackled its interior commerce, Government, fully convinced of the utility of an uniform system of measures, will take the most effectual means for accelerating the use of them, and for overcoming the resistance still opposed to it by old habits, which are already disappearing every day. From these considerations your Commission unanimously proposes the adoption of the *Senatus Consultum* presented by the Government.

Considering the source from which it came, and the circumstances under which it was made, the Report of the Commission is a significant and valuable testimony to the merits of the Church Calendar. The two objections to the Calendar—for only two are specified—are trifling, and seem to be introduced only because something of the sort was demanded by the occasion. The first objection is to *the unequal and whimsical length of the months;* to which it suffices to answer that the month holds its place in the Calendar by sufferance, and is an element which is not used for the attainment of any of its distinctive ends. The other is that " the origin of the year does not correspond to any " of the seasons ; " an objection which is virtually neutralized by the fact stated in the same sentence that it is put " nearly " at the time of the winter solstice. On the other hand, the admission that the attempt to introduce the decimal division was fruitless, being of necessity defeated by the complementary days at the end of the year ; and the preference for the week of seven days for a reason the

very reverse of that which led to the adoption of the decade, viz., that it was " independent of months and years," that is, did not measure them as the decade was intended to do ; and for the further reason that the week, " since the high-
" est antiquity, in which its origin is lost, circulates without
" interruption through centuries, mingling with the suc-
" cessive Calendars of different nations," deserve to be noted and remembered.   The law of nature points us to the year in the measurement of time, while the positive law of GOD enjoins on us also the week.   Had the year consisted of three hundred and sixty-four days, the week would have fitted into it beautifully, and the philosophers would have been satisfied.   But the one day with its supervening hours, minutes and seconds, made the week absolutely incommensurable with the year.   Hence they who follow nature alone have always grumbled at the week, and cherished the visionary hope of getting rid of it and substituting in its place some small but more tractable period ; if possible one that would exactly measure the year.   The Church, however, accepted both the natural and the positive law, and set herself, as in duty bound, to overcome the obstacle which their seeming repugnance interposed ; and, curiously enough, the very stone at which the wise ones of the world stumbled, was made by her the foundation of the system of chronology, by which mankind now, with one consent, measure the intervals of history, and refer all events, sacred and profane, to definite points of time.   And when the Church had completed her labours and shown men, by means of the Solar Cycle and the reformed Calendar, how the week conspires with the year for the perpetual adjustment and distribution of time, she must, of course, be infinitely obliged to the eminent philosopher who informs her that the distinctive excellence of the week consists in its

not being the aliquot part of a year ; and that it is in virtue of this very peculiarity that the week " circulates," as GOD intended it should, " without interruption through " centuries, mingling with the successive Calendars of dif- " ferent nations."

On the whole, the history of the Calendar of Reason, its pompous inauguration, and its inglorious failure, brings out, in more vivid colours, the harmony, on the subject under consideration, of the natural and positive law of GOD ; makes dearer to us than ever the LORD'S DAY and the week which is bound up with it ; and renders more impressive the fact, that even they who refuse the guidance of the Church of CHRIST in the concerns of Eternity, are nevertheless constrained to follow her lead in the regulation and distribution of Time.

<div align="center">Δόξα τῷ Θεῷ.</div>

APPENDIX.

THE following Tables, showing the month and day of the month on which Easter will fall (according to the New Style) in every year from 1900 to 1999, and from 2200 to 2299, have been prepared by WILLIAM MOORE, Esquire, the author of the "Demonstration of Gauss's Formula," given above, p. 186. They agree with the Easter-days which may be obtained from our General Tables, or directly from the Gregorian Tables ; but the application of Gauss's Formula (facilitated by Mr. Moore's new and original method) will be found in some cases (for example, A. D. 2285,) to reveal curious results.

For the explanation of the method referred to, see above pp. 185, 186.

TABLE I.

LIST OF EASTERS FOR 100 YEARS FROM 1900 TO 1999, INCLUSIVE, BY MR. MOORE'S APPLICATION OF GAUSS'S FORMULA.

Year.	d.	7 n−d.	$\left(\dfrac{2b+4c+N}{7}\right)$ R.	e.	MONTH.
1900	24	4	3	0	15 April.
1	13	1	2	3	7 "
2	2	5	1	6	*30 March.
3	21	0	0	0	12 April.
*4	10	4	5	2	3 "
5	29	6	4	3	23 "
6	18	3	3	6	*15 "
7	7	0	2	2	31 March.
*8	26	2	0	2	19 April.
9	15	6	6	5	11 "
10	4	3	5	1	27 March.
11	23	5	4	2	16 April.
*12	12	2	2	4	7 "
13	1	6	1	0	23 March.
14	20	1	0	1	12 April.
15	9	5	6	4	4 "
*16	28	0	4	4	23 "
17	17	4	3	0	8 "
18	6	1	2	3	31 March.
1919	24	4	1	5	20 April.
*20	13	1	6	0	4 "
21	2	5	5	3	27 March.
22	21	0	4	4	16 April.
23	10	4	3	0	1 "
*24	29	6	1	0	20 "
25	18	3	0	2	12 "
26	7	0	6	6	*4 "
27	26	2	5	0	17 "
*28	15	6	3	2	8 "
29	4	3	2	5	31 March.
30	23	5	1	6	*20 April.
31	12	2	0	2	5 "
*32	1	6	5	4	27 March.
33	20	1	4	5	16 April.
34	9	5	3	1	1 "
35	28	0	2	2	21 "
*36	17	4	0	4	12 "
37	6	1	6	0	28 March.
1938	24	4	5	2	17 April.
39	13	1	4	5	9 "
*40	2	5	2	0	24 March.
41	21	0	1	1	13 April.
42	10	4	0	4	5 "
43	29	6	6	5	25 "
*44	18	3	4	0	9 "
45	7	0	3	3	1 "
46	26	2	2	4	21 "
47	15	6	1	0	6 "
*48	4	3	6	2	28 March.
49	23	5	5	3	17 April.
1950	12	2	4	6	*9 "
1951	1	6	3	2	25 March.
*52	20	1	1	2	13 April.
53	9	5	0	5	5 "
54	28	0	6	6	18 "
55	17	4	5	2	10 "
*56	6	1	3	4	1 "
1957	24	4	2	6	*21 April.
58	13	1	1	2	6 "
59	2	5	0	5	29 March.
*60	21	0	5	5	17 April.
61	10	4	4	1	2 "
62	29	6	3	2	22 "
63	18	3	2	5	14 "
*64	7	0	0	0	29 March.
65	26	2	6	1	18 April.
66	15	6	5	4	10 "
67	4	3	4	0	26 March.
*68	23	5	2	0	14 April.
69	12	2	1	3	6 "
70	1	6	0	6	*29 March.
71	20	1	6	0	11 April.
*72	9	5	4	2	2 "
73	28	0	3	3	22 "
74	17	4	2	6	*14 "
75	6	1	1	2	30 March.
*1976	24	4	6	3	18 April.
77	13	1	5	6	*10 "
78	2	5	4	2	26 March.
79	21	0	3	3	15 April.
*80	10	4	1	5	6 "
81	29	6	0	6	*19 "
82	18	3	6	2	11 "
83	7	0	5	5	3 "
*84	26	2	3	5	22 "
85	15	6	2	1	7 "
86	4	3	1	4	30 March.
87	23	5	0	5	19 April.
*88	12	2	5	0	3 "
89	1	6	4	3	26 March.
90	20	1	3	4	15 April.
91	9	5	2	0	31 March.
*92	28	0	0	0	19 April.
93	17	4	6	3	11 "
94	6	1	5	6	*3 "
1995	24	4	4	1	16 April.
*1996	13	1	2	3	7 "
1997	2	5	1	6	*30 March.
1998	21	0	0	0	12 April.
1999	10	4	6	3	4 "

TABLE II.

LIST OF EASTERS FOR 100 YEARS FROM 2200 TO 2299, INCLUSIVE.

A. D.	Golden No.	Epact	Sunday Letter.	EASTER.	A. D.	Golden No.	Epact	Sunday Letter.	EASTER.
2200	xvi	13	E	6 April.	2250	ix	26	F	21 April.
1	xvii	24	D	19 " Ex.	51	x	7	E	13 "
2	xviii	5	C	11 "	52	xi	18	D C	28 March.
3	xix	16	B	3 "	53	xii	29	B	17 April.
4	i	28	A G	22 "	54	xiii	10	A	9 "
5	ii	9	F	7 "	55	xiv	21	G	25 March.
6	iii	20	E	30 March.	56	xv	2	F E	13 April.
7	iv	1	D	19 April.	57	xvi	13	D	5 "
8	v	12	C B	3 "	58	xvii	24	C	25 "
9	vi	23	A	26 March.	59	xviii	5	B	10 "
2210	vii	4	G	15 April.	2260	xix	16	A G	1 "
11	viii	15	F	31 March.	61	i	28	F	21 "
12	ix	26	E D	19 April.	62	ii	9	E	6 "
13	x	7	C	11 "	63	iii	20	D	29 March.
14	xi	18	B	27 March.	64	iv	1	C B	17 April.
15	xii	29	A	16 April.	65	v	12	A	2 "
16	xiii	10	G F	7 "	66	vi	23	G	25 March.
17	xiv	21	E	30 March.	67	vii	4	F	14 April.
18	xv	2	D	12 April.	68	viii	15	E D	5 "
19	xvi	13	C	4 "	69	ix	26	C	18 "
2220	xvii	24	B A	23 "	2270	x	7	B	10 "
21	xviii	5	G	15 "	71	xi	18	A	2 "
22	xix	16	F	31 March.	72	xii	29	G F	21 "
23	i	28	E	20 April.	73	xiii	10	E	6 "
24	ii	9	D C	11 "	74	xiv	21	D	29 March.
25	iii	20	B	27 March.	75	xv	2	C	18 April.
26	iv	1	A	16 April.	76	xvi	13	B A	2 "
27	v	12	G	8 "	77	xvii	24	G	22 "
28	vi	23	F E	23 March.	78	xviii	5	F	14 "
29	vii	4	D	12 April.	79	xix	16	E	30 March.
2230	viii	15	C	4 "	2280	i	28	D C	18 April.
31	ix	26	B	24 "	81	ii	9	B	10 "
32	x	7	A G	8 "	82	iii	20	A	26 March.
33	xi	18	F	31 March.	83	iv	1	G	15 April.
34	xii	29	E	20 April.	84	v	12	F E	6 "
35	xiii	10	D	5 "	85	vi	23	D	22 March.
36	xiv	21	C B	27 March.	86	vii	4	C	11 April.
37	xv	2	A	16 April.	87	viii	15	B	3 "
38	xvi	13	G	1 "	88	ix	26	A G	22 "
39	xvii	24	F	21 "	89	x	7	F	7 "
2240	xviii	5	E D	12 "	2290	xi	18	E	30 March.
41	xix	16	C	4 "	91	xii	29	D	19 April.
42	i	28	B	17 "	92	xiii	10	C B	10 "
43	ii	0	A	9 "	93	xiv	21	A	26 March.
44	iii	20	G F	31 March.	94	xv	2	G	15 April.
45	iv	1	E	13 April.	95	xvi	13	F	7 "
46	v	12	D	5 "	96	xvii	24	E D	19 " Ex.
47	vi	23	C	28 March.	97	xviii	5	C	11 "
48	vii	4	B A	16 April.	98	xix	16	B	3 "
2249	viii	15	G	1 "	2299	i	28	A	16 "

ADDENDUM.

TO counteract the error of the Lunar Cycle (referred to, page 184), and to adjust correctly the Epacts to the Golden Numbers, as well *before* as *after* the Epoch of the reformation, the Gregorian reformers deemed it sufficient to add three days to the Calendar on account of the lunar equations *before* 1582 ; viz., one day for the year 800, one for the year 1100, and one for the year 1400. This end was accomplished by simply deducting three days from the ten days that were cancelled in 1582 on account of the precession of the equinoxes, thus making the actual advance to be seven days ; and hence it was that the new moon of that year, the sixth of the Lunar Cycle, which in the Old Style of the Calendar falls on March 28th, is carried forward in the New Style to the 4th of April.